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A Journal of Industrial Art

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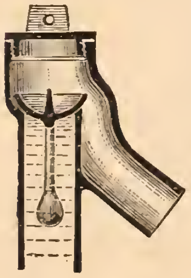

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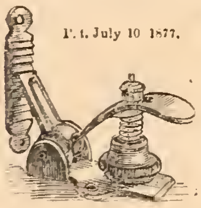

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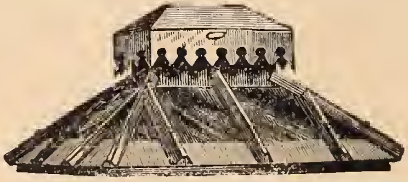

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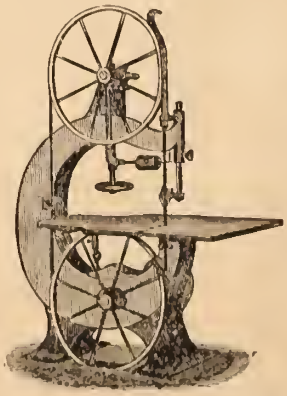

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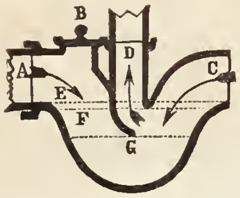

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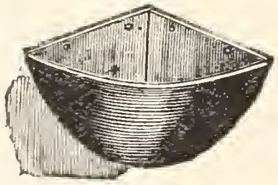

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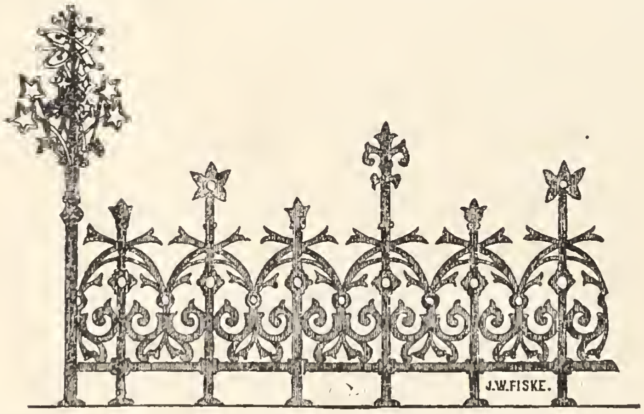

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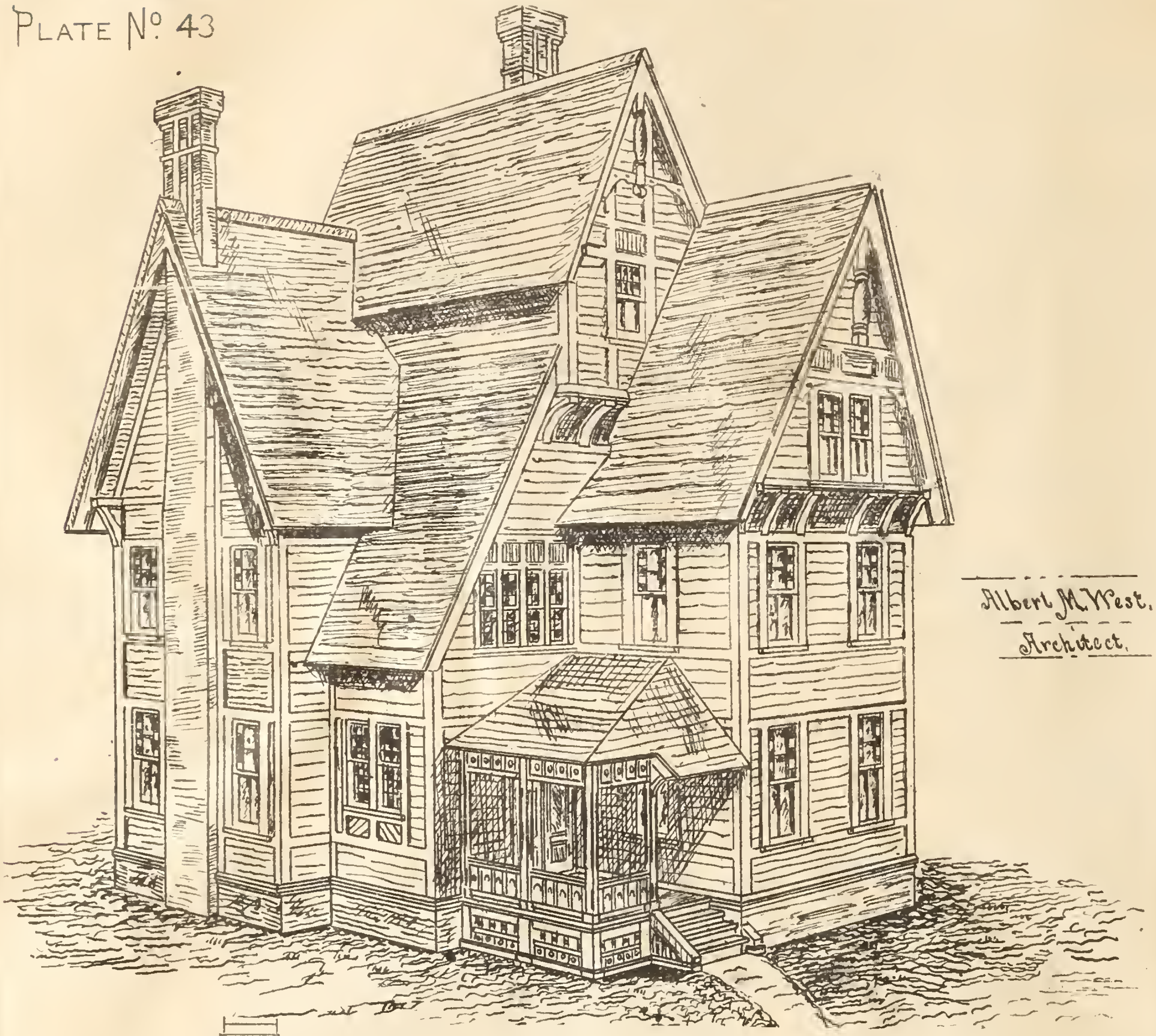

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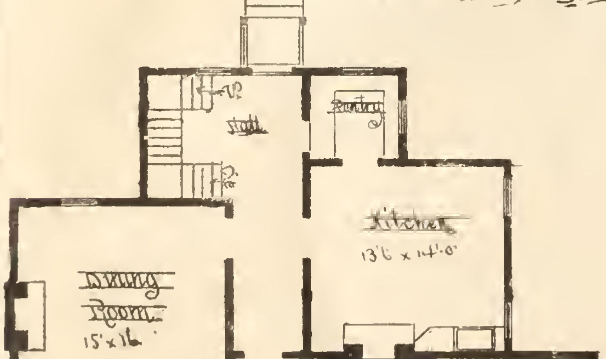

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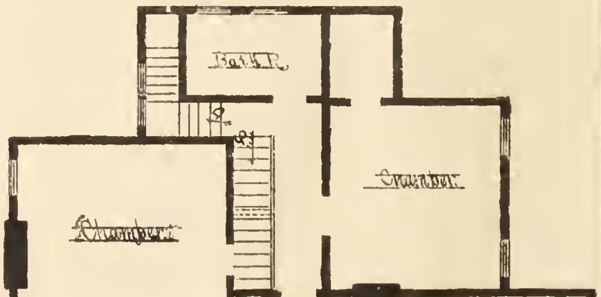

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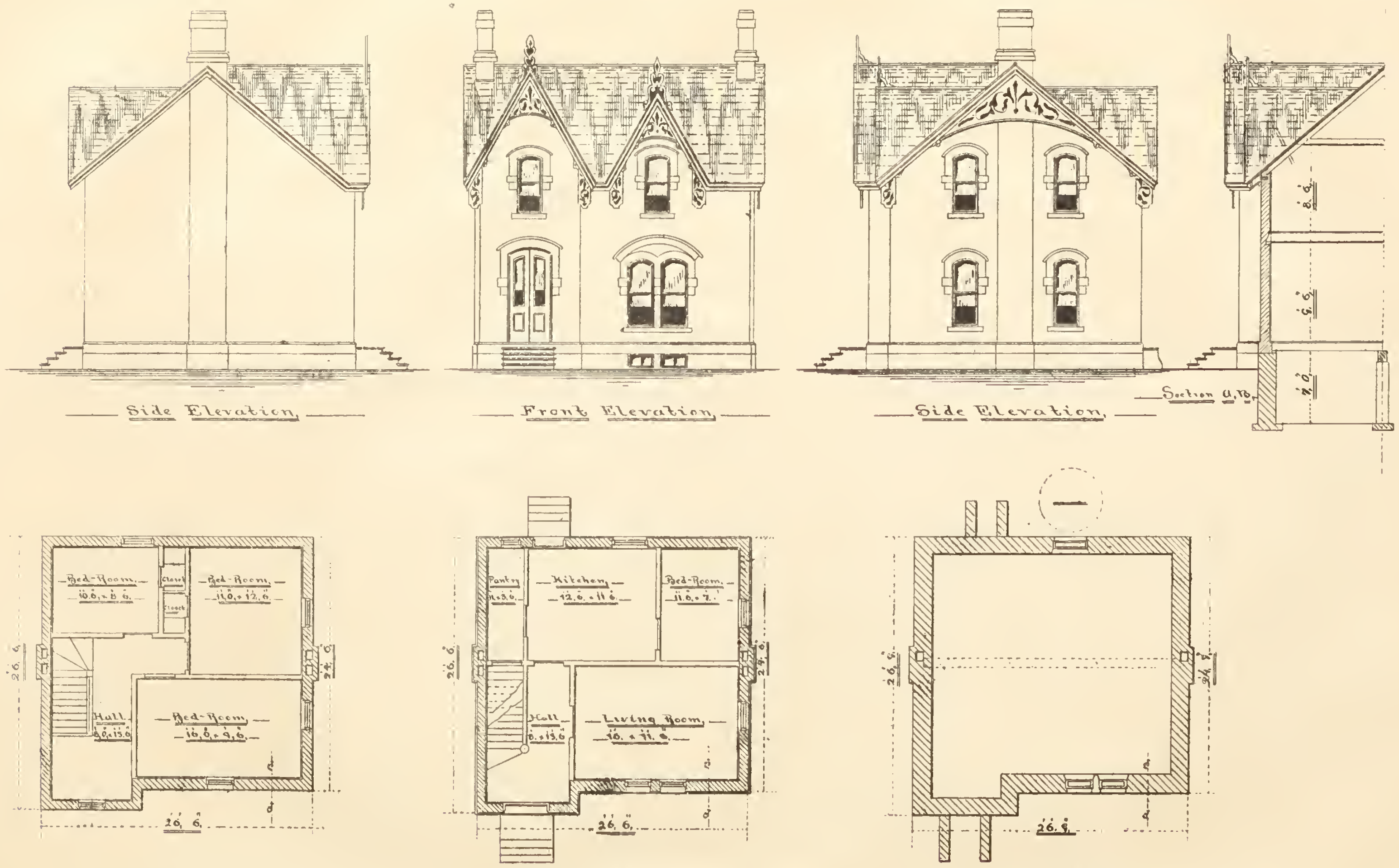

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The American Builder,

A JOURNAL OF INDUSTRIAL ART.

NEW YORK, NOVEMBER, 1878.

HEALTHY DWELLINGS.

THE Association for Improving the Condition of the Poor in this city has recently done a good service in causing to be published, for the benefit of tenants, a pamphlet containing all the provisions of the law with regard to the sanitary condition and arrangements of rented houses; and in which are set forth the responsibilities of property owners and the duties of the Health Department, showing what abuses are legally actionable, and how to bring a knowledge of these abuses before the proper authorities.

This action on the part of the Association cannot do other than result in good to the class it is designed to benefit, and it cannot be denied that there is room for good in that direction. But while the poor have our sympathy and best wishes, we should not forget that great body of toilers who are obliged to spend at least ten or twelve hours of each day at a desk, behind a counter, in front of a machine, or at a "case." A recent writer has well observed that, "if any man whose occupation is not chiefly out of doors will notice the time actually spent by him in the open air, he will be surprised to find how small a portion of the whole it is."

City men often spend, in fact, twenty to twenty-two hours per day indoors, and women twenty-two to twenty-three hours, even in fine weather. Not a few women's outdoor experiences are few and far between. It is obvious, therefore, that the investigation of the conditions which constitute a healthy dwelling place is deeply important and interesting to the great mass of mankind. Yet, what may be termed sanitary science, is, with many, a matter of little consequence. The ideas of very many in taking a house seldom go beyond rent, "handiness" and accommodation. By handiness we mean vicinage to their place of business, and to those apparently indispensable adjuncts "street cars" and "elevated railroads," "institutions," we suspect answerable for not a few of the physical ailments to which the modern New Yorker is subjected. Soil, atmosphere, the supply and quality of water, shelter from cold winds, sufficient light and sunshine, drainage and freedom from noxious effluvia, are often ignored or occupy a very inferior place in the house hunter's thoughts. As to ventilation, numbers of people must count it of no importance, otherwise our builders would provide for it much better than they do. Every window should be so arranged that the upper sash can be opened whenever required. Indeed a room where the top sheets of the windows will not open, will always have stagnant, foul air in it, and cannot be properly ventilated, or healthy. But it is not sufficient to provide for the egress of foul air. Very numerous are the instances in which even good houses, both in England and among ourselves, occupied by people of position and intelligence, are void of precautions for preventing the access of foul air. The closets are constantly so trapped and arranged, that frequently, in houses otherwise good, there is no direct drain, and impure air is always being generated and diffused, especially during the hours of the night, when change of air is not so readily effected as in the active hours of the day. But until questions of home, health and comfort stand forth more and more prominent among the items of education, become the subject of common talk and the objects of our aims, both publicly and in the daily routine of private life, we fear Lord Bacon's aphorism, "Houses are built to live in, not to look on," will continue to miss proper consideration, and that consequently the dark annals of what is known as preventible diseases will continue to be swelled by fresh chronicles.

Not the least among the singular ideas prevalent respecting home belongings is the notion, apparently by no means uncommon, that though some attention may be needful as regards the "quarters," as military men say, of the master and mistress and occasional guests, anything will do for servants and children. Some time ago a discussion took place in the London papers on the servant question, and Mr. Charles Reade, the novelist, was free with his roseate tints anent the generally superior accommodation now-a-days afforded servants.

Exception to his warm hues was as freely taken by some of the domestics whose position was under representation, and Mr. Blashill, who has paid great attention to all matters pertaining to health, comfort, and cleanliness in the house, appeared in a paper published in the *Times*, to side rather with Mary and Jeames on this matter than with Mr. Reade. He attributes the daily troubles of nine-tenths of the houses of the great metropolis touching the "scarcity" and "inefficiency" of "help," to the discomforts of the parts of the houses where they are placed, added to the dirty nature of the work expected from them. Garret bedrooms, dark and dreary, and basement kitchens, are most disagreeable for people who have to pass the greater part of their lives indoors, and are incompatible with healthy or cheerful existence. In fact, garret and basement stories are architects' and builders' abominations which ought to be everywhere discountenanced and consigned to the limbo of lapsed barbarisms and ignorances. "Cheerless kitchens," says Mr. Blashill, "have not only driven the female members of many families from occasional work in the culinary department, but have caused the best of the class from which servants are derived to leave it too."

Mr. Blashill also insists on the necessity of using extra precautions for ventilation in houses where gas is burned; of maintaining a regular temperature (about 60°) throughout the inhabited parts of a house; of abolishing spare or "show" rooms by living in all the rooms every day, or every day by turns; and of paying special attention to the larder, cellar, scullery and sink. The latter should always stand close to the outer wall, and in full light. Although more has been said of late on the subject of sinks, drains, closets and sewer gas, than any other subject relating to the sanitation of houses, few persons seem to pay the slightest heed to what is said. We believe also that the important influence of light and sunshine, especially on health, is very imperfectly realized. Verandas, thickly-planted shade trees, and venetian blinds, closely shut from morning to evening, exclude the cheery light of day in many houses to a degree incompatible with health or comfort.

"House and Home" is a subject in which all classes are interested, for all want improved dwellings—chiefly, however, the middle classes and the workingmen in city, town, and country. Demand creates supply ; and, until, by the spread of knowledge on sanitary matters, people in general are brought to apply the senses with all their natural acuteness and in equal measure for the investigation of healthy home conditions, so long will architects and builders in general continue to run up the dark, damp, undrained, unventilated, badly heated, cheerless domiciles so plentifully met with—houses "built for sale," and dear at any price. But when the details relating to the selection and daily routine of a home are better and more commonly understood, shoddy houses made only to "sell" or to "let," and put up without any regard to the "fitness of things," will cease to pay the constructers and will therefore cease to be built.

* * *

The final report of the committee of the British Association on the use of steel for structural purposes states : "Having given the subject our best consideration we recommend that the employment of steel in engineering structures should be authorized by the Board of Trade under the following conditions, namely : 1. That the steel employed should be cast steel or steel made by some process of fusion, subsequently rolled or hammered, and that it should be of a quality possessing considerable toughness and ductility, and that a certificate to the effect that the steel is of this description and quality should be forwarded to the Board of Trade by the engineer responsible for the structure. 2. That the greatest load which can be brought upon the bridge or structure, added to the weight of the superstructure, should not produce a greater strain in any part than 6½ tons per square inch. In conclusion we have to remark that in recommending a coefficient of 6½ tons per square inch for the employment of steel in railway structures generally, we are aware that cases may and probably will arise when it will be proposed to use steel of special make and still greater tenacity, and when a higher coefficient might be permissible, but we think those cases must be left for consideration when they arise, and that a higher coefficient may be then allowed in those instances where the reasons given appear to the Board of Trade to justify it." This report has since been acted upon by the Board of Trade in the printed paper issued by them in reference to railway structures : "It will be observed that a coefficient of 6½ tons per square inch is assigned to steel, that of iron being 6 tons per square inch. This increase of the coefficient will effect important economy in structures, especially in bridges of large spans, and will also tend generally to increase the employment of steel for railway and shipbuilding purposes. The labors of your committee having ended in such a satisfactory manner, there is no necessity to reappoint them." The report is signed by Mr. E. H. Carbutt, Mayor of Leeds, as secretary.

* * *

Color has a very considerable influence over a body's power of absorbing heat. If a thermometer on a hot summer's day be exposed to the sun, it will indicate a temperature of about 120 degrees ; but if the bulb be blackened with Indian ink or the smoke of a candle it will rise from 10 to 20 degrees higher. The reason for this is that the polished surface of the glass reflects some of the suns rays, but the blackened surface absorbs them all. Blue absorbs all but the blue rays ; red all but the red ; green and yellow all but those of their own name, and white reflects all the rays. The lightest colored rays are the most heating, therefore, light colored walls, but especially white, are the worst for fruit trees. The thermometer against a wall rendered black by coal tar rises five degrees higher in the sunshine than the same instrument suspended against a red brick structure of the same thickness ; nor will it cool lower at night, though its radiating power is increased by the increased darkness of its color if a proper screen be then employed.

* * *

A leading lumber dealer of Montreal gives some startling facts in regard to the lumber trade, and the great waste of timber in this country. According to this lumberman, who has been in the business twenty-five years, but four of the Northern States are now able to furnish timber beyond their own needs. Of these four, Maine is all but stripped of its pine, and even the spruce is going fast, so that the people of that State will in a few years find themselves without building timber enough for their own wants. In five or six years, the white pine of Michigan, Wisconsin and Minnesota will have disappeared. The reports of lack of water sufficient to float the logs, now so often heard, are due not so much to exceptionally dry seasons as to the fact that the lumbermen are penetrating farther and farther from the main streams. Indeed, the mill owners are now building railways to reach the last remote sources of the timber supply, and, of course, the end cannot under such circumstances be far distant.

It is true the public domain in the Northwest and the South contains an immense supply. The reports made to the Secretary of the Interior show that the great depredation carried on for years leaves only enough to supply the actual needs of settlers. In regard to the supposed inexhaustible supply in the Dominion, Mr. Little says that we cannot look to the Dominion for an inexhaustible supply of timber when our own forests shall have disappeared. "I will assert," he says, "from a personal knowledge of most of the timber sections of Canada, and trustworthy reports from others, that we have not, from the far-off province of Manitoba to the Gulf of St. Lawrence, as much pine, spruce, hemlock, oak, ash, elm, whitewood, and other commercial woods, as would supply the whole consumption of the United States for a period of three years."

It is estimated that five hundred million dollars would not purchase abroad all the lumber consumed in the United States annually; and, as a supply cannot be brought easily or cheaply from the Pacific coast, there is a strong necessity to protect the timber districts included in the public domain. And he says : "Doubtless the time will come when tree planting shall receive the encouragement it is given in other countries, and doubtless, also, a demand will arise for the abrogation of the duty on Canadian lumber, in order that we may have an opportunity to husband our own failing supply; but there should be no hindrance placed in the way of immediate energetic measures for the protection of the timber lands of the United States not yet surrendered to private or corporate control."

* * *

Sieur recommends very highly the use of sawdust in mortar, as superior even to hair for the prevention of cracking and subsequent peeling off, of rough casing under the action of storms and frost. His own house, exposed to prolonged storms on the seacoast, had pieces of mortar to be renewed each spring; and, after trying without effect a number of substances to prevent it, he found sawdust perfectly satisfactory. It was first thoroughly dried, and sifted through an ordinary grain sieve, to remove the larger particles. The mortar was made by mixing one part of cement, two of lime, two of sawdust, and five of sharp sand, the sawdust being first well mixed dry with the cement and sand.

* * *

The New York Society of Decorative Art announces the following lectures in Association Hall: "Egyptian Art," by Charles Dudley Warner; "Japanese Art," by Prof. W. E. Griffis, formerly of the Imperial College at Tokio; "Ancient Art," by Gen. Di Cesnola; "Tapestry," by Jno. L. Hayes of Boston; "Pottery," by W. C. Prime; "American Art in the Future," by C. C. Perkins of Boston.

THE MANAGEMENT AND CARE OF WOOD-WORKING MACHINERY.

BY JAMES MACDONALD.

[*Second Paper.*]

Cheap and unskilled labor is, unfortunately, much employed in wood-working shops and intrusted with the care and management of fine machinery, the very first principles of which are often a riddle to the operator. Especially is this the case with regard to the steam engine and boiler. If the engine is small, or does not require the whole attention of a man to run it, it is either intrusted to the hands of the "greenest apprentice," or the man is required to occupy his spare moments with some other work; and while thus engaged it not unfrequently happens that the engine suffers by some of its working parts running dry, or the water disappears from the gauges on the boiler, and plates and tubes thus exposed, if not actually burned, are heated and expanded to such a degree as to cause leakage. This abnormal expansion sometimes takes place, and is unnoticed by the person in charge. Excessive sweating, or small hissing leaks at the ends of the tubes and plate joints, is the result. These will, in course of time, if the overheating is not repeated, close up. The small hole becomes cemented with rust and mineral impurities contained in the water, and for a time the boiler is apparently sound. The germ of disease is nevertheless implanted in the metal. Oxidation has begun its work and will continue with deadly certainty to the end. The heads of rivets and stay bolts become eaten and weakened, and the boiler is eventually unfit for use. If a boiler is kept clean, free from incrustations and sediment, and with a sufficient supply of water, there will be little danger of burning. Incrustations, mud or other deposits, left by hard and dirty water, are very injurious; being bad conductors of heat, they prevent its passage to the water for steam generating. The plates become heated and expanded to a high degree, and should the water break through the scale and come in contact with the red hot plates, an enormous quantity of steam will be instantly generated, and an explosion likely to follow. Frequent "blowing off," when impure water is used, is the most simple means of preventing deposits. For the removal of scale there are a number of compounds in the market, but the writer has had very satisfactory results from placing four or five pounds of zinc in the boiler. The zinc becomes eaten, probably by some chemical action, and the scale is cut away from the metal and can be easily removed through the mud ports. The feed water pipe, near the boiler, is very apt to become choked with sediment, and should be examined occasionally. In firing it is best to make light charges, as they are required, especially if the fuel used be coal. The fire, by this means, is not deadened, the combustion is more complete, and there will be less soot and ash deposited in the tubes or flues. Should it be found necessary to use an artificial draught, a small jet of steam either from the boiler or the exhaust of the engine, admitted at the base of the chimney, will answer. To insure the best natural draught, a brick chimney should be used. Iron funnels being cheaper are much used and give very good results, but being thin, the heated gases are partially cooled before reaching the top, thus reducing their velocity. The tubes and ash pit should be regularly cleaned at least once every day. The attendant should practice the old adage "a stitch in time saves nine," and make all repairs punctually. A hissing valve, joint, or leaking cock, may be made tight with less trouble at first than if allowed to run. In tightening brass valves and cock plugs to brass seats, nothing coarser than the finest grade of emery should be used. If the seats are much worn and can be removed, it will pay to take them to a lathe and have them bored true. In grinding with fine emery when first put on the valve, the pressure applied should be very light to avoid cutting grooves in the seat. The safety valve should be raised occasionally to prevent sticking to the seat. The lever must be provided with a guard to prevent the valve from raising too high and "blowing off" the boiler.

A good heater is an indispensable appendage to a boiler. By the heat of the exhaust steam alone, the feed water may be raised to or near the boiling point, thus performing nearly one-fifth of the work exerted by the boiler in converting the water into steam.

(*To be continued.*)

PRACTICAL CARPENTRY.

Second Paper.

When an angle is expressed by three letters, as A B C, Fig. 1 (Plate 46), the middle letter B should always denote the angular point; where there is only one angle, it may be expressed more concisely by a letter placed at the angular point only, as the angle at A, Fig. 2.

The quantity of an angle is estimated by the arc of any circle contained between the two sides or lines forming the angle; the junction of the two lines, or vertex of the angle, being the centre from which the arc is described. The circumference of every circle is divided by mathematicians into 360 equal parts, called degrees; each degree being again subdivided into 60 equal parts called minutes, and each minute into 60 equal parts called seconds. Hence it follows that the arc of a quarter circle, or quadrant, includes 90 degrees, that is, one-fourth part of 360 degrees. By dividing a quarter circle contained between two radii or lines forming a right angle into 90 equal parts, or, as shown in Fig. 3, into nine equal parts of ten degrees each, then drawing straight lines from the centre through each point of division in the arc, the right angle will be divided into nine equal angles of ten degrees each. Thus, suppose B C the horizontal line, and A B the perpendicular ascending from it, any line drawn from B—the centre from which the arc is described—to any point on its circumference, determines the degree of inclination or angle formed between it and the horizontal line B C. Thus a line from the centre B (Fig. 3), to the tenth degree, separates an angle of ten degrees, and so on. In this manner the various slopes or indications of angles are defined.

A right angle is produced either by one straight line standing upon another, so as to make the adjacent angles equal (Fig. 4), or by the intersection of two straight lines so as to make all the four angles equal to one another, as Fig. 5.

An acute angle is less than a right angle, or less than 90 degrees, as the angle A B C, Fig. 6.

An obtuse angle is greater than a right angle, or more than 90 degrees, as F C G, Fig. 7.

Plane figures are bounded by straight lines, and are named according to the number of sides or angles which they contain; thus, the space included within three straight lines and forming three angles, is called a trilateral figure or triangle.

A right-angled triangle has one right angle; the sides forming the right angle are called the base and perpendicular, and the side opposite the right angle is named the hypotenuse. Thus, in the right-angled triangle A B C (Fig. 8), B C is the base, A B the perpendicular, and A C the hypotenuse. The hypotenuse, or longest side of a right-angled triangle, may also form the base or under line. In that case the other two sides are called the legs of the triangle.

An equilateral triangle is that whose sides are equal, as in Fig. 9.

An isosceles triangle has only two sides equal, as in Fig. 10.

A scalene triangle is that whose three sides are all unequal, as shown in Fig 11.

An acute-angled triangle has all its angles acute, as those in Figs. 9 and 10.

An obtuse-angled triangle has one of its angles obtuse, as in Fig. 11. It is obvious from Fig. 11 that a triangle cannot contain more than one obtuse angle.

The triangle is one of the most useful of geometrical figures in taking dimensions; for since all figures that are bounded by straight lines are capable of being divided into triangles, and as the form of a triangle cannot be altered without changing the length of some one of its sides, it follows that the true form of any figure can be preserved by having the length of the sides of the different triangles into which it is divided, as will be shown in a future paper.

Quadrilateral figures are literally four-sided figures. They are also called quadrangles, because they have four angles.

A parallelogram is a figure whose opposite sides are parallel, as A B C D, Fig. 12.

A rectangle is a parallelogram having four right angles, as A B C D, Fig. 12.

A square is an equilateral rectangle, having all its sides equal, as B, Fig. 13.

An oblong is a rectangle whose adjacent sides are unequal, as the parallelogram A B C D, Fig. 12.

A rhombus is an oblique-angled figure, or parallelogram, having four equal sides, whose opposite angles only are equal, as C, Fig. 14.

A rhomboid is an oblique-angled parallelogram, of which the adjoining sides are unequal, as D, Fig. 15.

A trapezium is an irregular quadridateral figure having no two sides parallel, as E, Fig. 16.

A trapezoid is a quadrilateral figure which has two of its opposite sides parallel, and the remaining two neither parallel nor equal to one another, as F, Fig. 17.

A diagonal is a straight line drawn between two opposite angular points of a quadrilateral figure, or between any two angular points of a polygon. Should the figure be a parallelogram, the diagonal will divide it into two equal triangles, the opposite sides and angles of which will be equal to one another.

Let A B C D, Fig. 18, be a parallelogram; join A C, then A C is a diagonal, and the triangles A D C, A B C, into which it divides the parallelogram, are equal.

A plane figure having more than four straight lines for its boundary, is called a polygon. A regular polygon has all its sides equal, and consequently all its angles are equal, as is shown in K L M, and N, Figs. 20-23. An irregular polygon has its sides and angles unequal, as H, Fig. 19. Polygons are named according to the number of their sides, or angles, as follows:

A pentagon has five sides.
A hexagon has six sides.
A heptagon has seven sides.
An octagon has eight sides.
An enneagon has nine sides.
A decagon has ten sides.
An undecagon has eleven sides.
A dodecagon has twelve sides.

[*To be continued.*]

* * *

PLASTER AND HOW TO USE IT.

By Old Hand.

A material called "Scagliola," is often used to imitate the finer kind of marble for the decoration of wall surfaces. It is composed of plaster, with alum and some color mixed into a paste, and afterwards beaten on a prepared surface with fragments of marble. It is, when properly prepared, very hard, durable, and susceptible of a fine polish. The surface on which it is to be placed has a rough coating of lime and hair. The plaster used in making the scagliola must be of the best plaster of Paris. It is only used when the finer kinds of marble are to be imitated; as many different shades of color must be mixed up separately as there are in the kind of marble to be imitated. As these colors have to be mixed up by hand, a good deal of skill is required on the part of the operator.

When the cement is laid on the prepared surface, and is properly hardened, the polishing is commenced by rubbing the surface with pumice-stone, and cleaning it thereafter with a wet sponge. It is next rubbed with tripoli and charcoal, and thereafter with a felt rubber dipped in oil and tripoli, and finally finished off with felt dipped in oil only.

Carton Pierre is a material used for the making of raised ornaments for wall and roof decoration. It is composed of the pulp of paper mixed with whiting and glue, this being forced into plaster molds backed with paper, and then removed to a drying room to harden. It is much stronger and lighter than common plaster of Paris ornaments, and is not so liable to chip or break if struck with anything.

Papier Maché is now largely used for ornamental purposes. It is prepared by laying sheets of brown paper one over another, and fastening them together by coats of glue between them. The sheets thus united are put in a metal mold and pressed to the shape of ornament required. When taken out, the object is trimmed where required and laid away until perfectly dry, when it is colored to suit the place it is designed for.

In the improved process of making ornaments of papier maché, a composition of pulp of paper and resin is first placed in the mold, the papier maché ornament, previously shaped or molded as above described, is again put in the mold, and the pulp and resin adhering to the face of the paper produce a fine sharp surface.

Stamped leather, and other pliable materials are often used for ornamental and decorative purposes.

"Stearate of Lime" as it is called, is now frequently employed for the finishing coat by those who know how to make it, but, as the knowledge of preparing this material is confined to a few knowing ones, it is not used as much as it deserves to be. The following method of making "Stearate of Lime" though known to many of our readers, perhaps, will be worth something to those who are not in the secret. Take a large barrel, leave the top end open, sink it two, or two and a half feet in the ground, pound the earth solid around it so that it is firm; place a 4x4 scantling with a two inch round hole in the centre through one of its sides, at the bottom of the barrel and make it fast.. Now have an upright shaft of wood, with one end rounded so as to fit easily into the round hole formed in the scantling. This shaft must be six or seven feet long, with a lever on the top about four feet long; arms must be mortised through that part of the shaft that remains in the barrel, and cleats or bars must be nailed on these arms perpendicularly, and all must be made so that it will revolve in the barrel with freedom. The upper end of the shaft must be secured by a gallows frame or otherwise, so that the lever fastened on its upper end can be worked without fouling with any of the attachments. The whole machine when finished will be somewhat similar to a "pug" or "clay-mill."

Now, for the "Stearate;" it will require one bushel of good lime, about twenty pounds of clean beef suet, which must be chopped very fine, and boiling water enough must be kept on hand to fill the barrel. It requires a man and a boy to prepare the material properly; the former to feed, first, lime, then suet, then hot water; then lime, suet, and hot water, and so on, until the barrel is full; and the latter to continually turn the mill, until the barrel is full and the ingredients thoroughly mixed.

The mode of application is quite simple. The walls are prepared in the usual manner, with a scratch coat, and a browning coat, the latter being "floated" with a "darby." When the last coat is sufficiently dry, the prepared "Stearate" may be applied "hot," with an ordinary whitewash brush, two coats generally being sufficient to make a first-class job.

The suet used in the manufacture of "Stearate" undergoes a chemical change when added to the lime and hot water, and combines with the lime in such a manner that it forms a kind of paint impervious to water, and outlasts, for the covering of brick, stone, or concerte, any oil paints employed for that purpose. The "Stearate" can be made to assume any hue desired, by the addition of any of the ordinary stainers, but it is more durable when used in its purity.

Last month we showed in the "Detail Sheet" nine examples of wall decoration—panels and scrolls; this month we reproduce eighteen examples of cornices, in Plate 45. The plasterer of ordinary ability will be able to select from these examples designs suitable for any position. They are all numbered for reference, and can easily be enlarged to suit the requirements of the operator.

BUILDERS' BOOK-KEEPING.

Few builders are so utterly reckless of consequences as to omit to keep any account of their building transactions, and these few belong to the least reputable class. The fault which may most generally be charged to the craft is a lack of accuracy in the methods of accounting which are adopted. Loose and irregular book-keeping, an unwarrantable dependence on the accounts of others, and a total inability to arrange the costs of building in a clear and intelligible total, lie at the bottom of much of the prevailing misfortune in building enterprises. And yet no manufacturing business admits of more easy control in the matter of accounts, or presents such a favorable opportunity for the natural and systematic array of costs. There are many establishments, the leading ones, of course, in which careful and accurate books of account are kept, and where the book-keeping is as exact and scientific as in any bank or counting-room. The majority of active builders, however, are prone to charge their memories merely with the items of their business, and to rely rather upon haphazard or lump calculations of cost. As we are now entering upon an era of close and sharp competition in the building line, accurately determined costs of production will become indispensable elements of success and safeguards against failure. Builders generally should habituate themselves to reduce their business to a reliable system of accounts, and accustom themselves to regard their operation from the standpoint of close and careful calculation.

The advantages of accurate accountings are too obvious to require illustration or enforcement, and must be already fully appreciated by any who have heretofore relied upon them. The slightest experience with systems of accounts cannot fail to commend them to those who have heretofore ignored them.

The simplest phase of the building business is, that in which the master builder acts merely as an overseer or superintendent of the work, and does not undertake to perform in person any specific task. Where all the different items of work, including mason's and carpenter's work, are given out in contracts, the arrangement of these items of detailed cost in a consolidated result is a simple matter of arithmetic. The work becomes more complicated where either the mason or carpenter work, or both, is undertaken in person by the master builder operating through foremen and employed mechanics. To make the cost of such works tally with the other items of cost, it becomes necessary to keep a close watch over the outgo of expenditures.

No man is competent to act as foreman who is not able to keep an accurate time book, and to apportion the sums paid for labor to the various jobs where they belong. The foreman should also be able to discriminate the bills of materials purchased, so that their cost may be likewise properly apportioned. Where a business is large and intricate, such tasks are likely to become too onerous for the foreman to attend to, and then it becomes necessary to deputize a clerk of the works, whose business it shall be to regulate and formulate the expenses of production.

Some builders undertake to perform with their own hired mechanics a great variety of work connected with house building, such as the painting, plastering, brown stone and stair work, besides the mason and carpenter work. In these cases the accounts become very voluminous and complicated, and the employment of a skilled book-keeper becomes imperative.

We have no idea of being able to suggest plans and methods to those builders who are already conducting their business on a sound mercantile basis. But we cannot lose sight of the fact that a great deal of business is not so conducted. For the benefit of the average house-builder, we will venture to suggest a few leading ideas which will enable an intelligent man without trained assistance to maintain thorough or sufficient oversight and control over the expenditures of his business.

The items of work which are given out in separate contracts present little difficulty, as these may be readily formulated. A strict record should be kept of payments made to the several sub-contractors on account of their contracts. An ordinary memorandum book, such as may be purchased on the streets or at the stationer's, will suffice for this purpose. One page in such a book should be devoted to each individual contract, and should be headed with the name of the sub-contractor. On such a page should be entered the date and amount of each partial payment of the contract price. This will enable the builder to see at a glance how much has been paid and how much is due upon a given contract. We may add, that such an account faithfully kept will constitute acceptable evidence in any court of law.

The accounts of mason and carpenter work call for greater minutiæ and particularity. Separate and accurate pay-rolls should be kept for each job, whether the work performed may be done on the premises where the improvement is being made, or away from them. In carpenter work, especially, the pay-roll of all shop work should be properly apportioned and distributed among the several jobs, and each sub-division charged under its appropriate head in the book of each job. The rule should be rigidly enforced of requiring all material men to furnish separate itemized bills for material sent to any particular job, or intended to be used for a specific job. As these bills are received their totals should be entered on the account book under the appropriate heading, whether for carpenter or mason work.

A page in the memorandum book should be devoted to lot account, in which the original cost of the land should be entered, and for convenience all the incidental expenses not appertaining to the mechanical portion of the work may be entered in the same account, such as interest, taxes, legal and architectural fees, brokerages, etc.

Such a system of accounts really embraces all that is necessary to furnish a builder with an intelligible view of the cost of his work as it progresses. It would be well to devote a page in this book to a record of any notes which may be given out, indicating their dates of maturity and amounts.

The only further suggestion that we have to make is that a monthly balance sheet should be taken off in a form which we will indicate. This balance sheet will consist of an enumeration of the headings of all these accounts. Three parallel columns will be required to display the needful data. In the first column, opposite its appropriate heading, may be stated the total amount of each contract as made, or the assumed cost of the item of work. In the second column may be given the amount paid on account of each item. In the third column may be stated the difference between the respective amounts in the second and first columns—which will be the amounts unpaid and due on each item of work, and the total of these differences will be the whole amount unpaid on the job. This balance sheet will enable the builder to perceive at a glance the precise financial position of his job, and will constitute besides a faithful monitor of the accruing costs and their distribution.

We submit this form of balance sheet without any further explanation, believing that it will commend itself to the approval of painstaking builders, and as here presented will be self-explanatory.

BUILDER'S BALANCE SHEET.

Heads of Accounts.	Amounts of Contracts and estimated cost.	Amounts paid on account.	Balances due.
Brown stone work	$	$	$
Bells and tubes			
Blinds, inside and outside			
Blue stone work			
Carpenter work, including—			
Hardware			
Labor			
Timbers			
Trimmings			
Dumb waiters			
Framing			
Sash and sky lights			
Glass, plate—sheet and fancy			
Doors—hardwood and pine			
Hardwood mantels			
Mirror frames and cornices			
Wainscotting			
Iron work			
Plasterer's work			
Roofer's work			
Furnace work			
Stair work			
Gasfitting work			
Plumbing work			
Marble work			
Grate work			
Range work			
Painting			
Mason work, including—			
Excavating			
Bricks			
Labor			
Building stone			
Lime and cement			
Lot account, including—			
Price of land			
Interest account			
Taxes			
Surveyor's fee			
Architect's fee			
Counsel's fee			
Insurance			
Coal			
Permits			
Watching			
Brokerage			
Totals			

—[*Real Estate Record.*

CORRESPONDENCE.

The Editor does not hold himself responsible for any opinions that appear in this column. Contributions are solicited from all who are interested in building operations.

[TO THE EDITOR OF "OURS."]

To the Editor of "Ours":

The October number of "OURS" just to hand, and it was as welcome as though it had been a five dollar note.

The Square, as designed by Mr. Hodgson, suits me to a fraction; I have no suggestion to make, as it is perfection as he presents it; so, let us have it as soon as possible. Put me down for two.

There is just now a growing demand for a better class of buildings than heretofore, in this place, and, as a matter of course, there is a desire to obtain a better class of workmen, especially of the honest sort.

A sober, reliable and skilled mechanic, one who would be willing to make Texas his future home, might do well by coming to this town.

Should there be any of your readers who would like to venture out here, and who are made of the right "stuff," I should be pleased to furnish them with any particulars they might desire, if they will communicate with me at my address at this place. Long may you wave!

T. J. Stirman.

Cameron, Texas, October 10th, 1878.

[To the Editor of the Builder.]

The Builder for September has just found its way to our quarters in the country where we have taken refuge. A little late, it is true, but never more welcome. In making the trip it had evidently been in strange company, yet all its pages were bright and cheerful looking as heretofore, on which I find additional evidence of the approach of the better time for the man of toil in the North, East and West, while it seems that the South is doomed by the gods to suffer, now from pestilence, as once from folly, the industries are paralyzed and two hundred thousand people gone from their homes, while other thousands have passed to the other land. Life, like the Spring time blood of plants, was just beginning to infuse itself into communities of this section of the country when the dread pestilence broke out in our midst and with it as a consequence comes a deep gloom of sorrow, such as none can know but those who have passed the same ordeal. There may be energy enough left to carry us above the tide of want and continued suffering, after this passes away, but for the want of means it will be a hard struggle.

I am always delighted with the detail sheet of the Builder. as well as many other features that contribute to make it of more practical value to the mechanic than can be had anywhere else for twice the money.

I am not much concerned about hoppercuts and such like; give me more Longstaff; I will also take stock in the Square, as it is, being satisfied with what the brains employed in its production will put on the market, and believing it will be an improvement on the square of the daddies, still it may not be needed bad enough to coax manufacturers to take advantage of the situation. In any event count me in for one square or more.

W. L. Jones.

Holly Springs, Miss., Oct. 5th, 1878.

[To the Editor of the Builder.]

I have not seen the method for hopper cuts promised by J. Balsley, but hope to soon, if it differs from those already given.

In the question and answer column of last number (Oct.) is given a method for obtaining rafters for a Mansard roof. I have not had time to try the curve, but the length of hip as given is somewhat faulty. It reads: "To get the hip V, Fig. 5, &c. (see page 229), you have R, the length of the rafter for a perpendicular, and Q Z the seat of the hip for a base, giving the length of the hip," which cannot be. R, the perpendicular in Fig. 5, should be the same as perpendicular in Fig. 4 (the rise of the roof). Or, if we take R the rafter as a perpendicular, we must take the seat or run of the rafter as a base, and the result will be the same; the diagonal will be the length of the hip.

Alonzo.

Boston, Mass., Oct. 16th, 1878.

[Our correspondent is right: there appears to be a slight error in the lettering and describing the diagram referred to in his letter; the "perpendicular R" should simply be the "rise" of the roof. The description is perfect as regards other particulars.—*Ed.*]

QUESTIONS AND ANSWERS.

Our readers are requested to send in questions for this column early in the month, and the more they send the better we shall be pleased. We propose to answer only such questions as are asked, and not to pad this department with scraps clipped from other journals, or with matter made up from encyclopædias and text books. Frequently the person who asks the question is able to answer it better than the editor, having given the subject more attention, and from such we would solicit a written answer. Contributions to this department are earnestly solicited from our readers generally.

John Walsh, Port Huron, Mich., asks "for some method by which he can prevent the brick walls of his house from 'sweating' on the inside?" *Ans.:* We have frequently had to deal with this trouble, and we find that in most of cases the complaint is constitutional and cannot be removed without going to a deal of expense. The only *effectual* way to keep the inner walls from getting damp, is to "fur out the walls" and lath and plaster over them again. Of course this would necessitate the widening out of all the window and outside door jambs or linings, but the inside trimmings, if taken off with care, could be used again. This method, if adopted, would *certainly* render your walls dry.

If you do not care to go to the expense of the foregoing, try either of the following, they are both strongly recommended. Take ¾lb. of mottled soap and dissolve in one gallon of boiling water. Spread this solution, while hot, with a flat brush, over the brick work on the outside, care being taken that it does not lather; this is allowed to dry for twenty-four hours, when a solution formed of ¼lb. of alum dissolved in two gallons of water, is applied in a similar manner over the coating of soap. The soap and alum form an insoluble varnish, which the rain is unable to penetrate, and this cause of dampness is thus removed. The operation should be performed in dry settled weather.

The other method is to use eight parts of linseed oil and one part of sulphur, heated together to 278°, in an iron vessel, and then applied like ordinary paint.

It will be noticed that these remedies are only intended to keep the damp from penetrating through the walls from the outside; but it will be found that most walls "sweat" on account of the foundations not being properly drained, and where the plaster is "laid" on the bare bricks, these remedies will prove ineffectual.

Wm. Watts, Detroit, Mich.: "Will you kindly enlighten me as to the difference in meaning between the words "taste" and "æsthetics," if any, in matters pertaining to art?" *Ans.:* The word "æsthetic" implies the perception and the study of those qualities which constitute the beautiful and artistic, and form the finer essence of all productions of fine art; it carries with it, therefore, a more exact and philosophic meaning than the word "taste;" in its adjective form, in which it more frequently occurs, it is particularly useful, as no adequate epithet can be substituted for it. Thus we speak of the "æsthetic sense," of "æsthetic feeling," or "study," or "principles," etc., but we cannot correctly say the "tasteful sense," or "tasteful study," etc. So you see that, although the words are somewhat synonymous, they are used for different purposes.

O. Reynolds, New York City: "What is the correct manner of reducing window tracery? What works would you advise me to procure, that treat on windows and tracery?" *Ans.:* (1) Reduce the tracery bars to their central lines, then carefully find the centers for striking the arches, circular parts, cuspings, and measure the several radii. An outline sketch of the window, showing the center lines, should be first carefully drawn, and afterwards figured in; this being done, the glass openings clear of the tracery should be measured and drawn, after which the filling in of the mouldings will present little trouble. (2) "Rosengarten's Architectural Styles," or "Billings's Infinity of Geometric Design." Either one of these works will furnish you with all the examples you require. The former work is the most useful for the ordinary workman.

John Hood, Staten Island: "Is it true that sand taken from the sea shore is unfit for use in plastering?" *Ans.:* For plastering, the use of sea-sand, or sand impregnated with salt water, would certainly be objectionable, and some architects constantly specify against the use of sea-sand for any constructive or decorative purpose; that is to say, they will not allow of its being used in mortar, plaster or concrete.

J. W., Racine, Wis.: "I require a cistern that will hold about 160 barrels of water. Please tell me the dimensions I should use?" *Ans.:* Make it nine feet six inches diameter, and nine feet eight inches deep, and it will have capacity for a trifle over 160 barrels.

NEW PUBLICATIONS.

Palliser's Model Homes, contains a variety of designs for model dwellings, farm, barn and hennery, stable and carriage house, school-house, masonic association building, bank and library, town-hall and three churches, together with a large amount of miscellaneous matter, making in all a very valuable book for every one who contemplates building. Price $1.00.

One good feature of this book is that the illustrations are taken from actual buildings now standing, so that the practical man will see at once that the designs can be closely followed without danger of finding the plans faulty, as is frequently the case with drawings that have been prepared expressly for "show and embellishment." The work contains about seventy illustrations of plans, elevations, &c. The buildings shown have the cost of each given, which ranges, from $500 to $10,000.

Besides the illustrations, descriptions and estimates, the book contains a large amount of miscellaneous but useful information, such as would prove of great value to persons contemplating building. We take the following extracts from the chapter entitled "Hints on Building":

"When people who build homes have had the experience the writer of this has, and had to fight scarlet fever and diphtheria and grim death itself, through the want of a proper system of drainage, then they will perhaps realize that this is indeed one of the first and most important things to be taken up in the planning and erection of a home, and one which will not bear a saving at the spigot and wholesale waste at the bung hole." And again, from the same chapter: "A close observer in traveling through the country towns and villages, in almost every portion of our country, cannot fail to notice the sameness and monotony of most country residences, which are nearly all built after one order, and very frequently a large number in each village all just alike, presenting symmetrical aspects. There is the country house of say from 36 to 40 feet front; the front door in the centre, two windows on each side, two stories high, and roof about $\frac{1}{3}$ pitch, with that same old box cornice we presume they copied from what Noah had on the Ark. This matter of symmetry is a very grave question, and one which may work well enough on large public buildings, but should have nothing to do with the design and arrangement of private dwellings. Fancy your building a house with the sitting and dining room on the south side, to which you want bay windows; and as the kitchen comes on the north side, as it is necessary to have a symmetrical house, it must have a bay window there also, or else dispense with the bay on the south side. There are undoubtedly a great many people who are willing to satisfy their vain pleasure of displaying outside, regular and monumental exteriors, by sacrificing those daily conveniences which are so essential to the comforts of a home."

We can send the book to any address in the United States or Canada, post paid, on receipt of the price.

The Art Interchange.—We have received the first number of a paper published by the Society of Decorative Art in this city. It is a neat quarto of eight pages, and is to be published every fortnight in furtherance of the objects of the Society, and to contain racy gossip, instruction and criticism on matters pertaining to art. A number of eminent writers have engaged to contribute to its pages, and the number before us contains a very readable article on Cyprus, from the pen of Madame Di Cesnola. The paper is called *The Art Interchange* and is issued from 34 East 19th street, N. Y.

Elements of Plane and Solid Free-Hand Geometrical Drawing, with lettering, and some elements of Geometrical Ornamental Design, including the principles of harmonic and regular ratios, etc. In three parts:

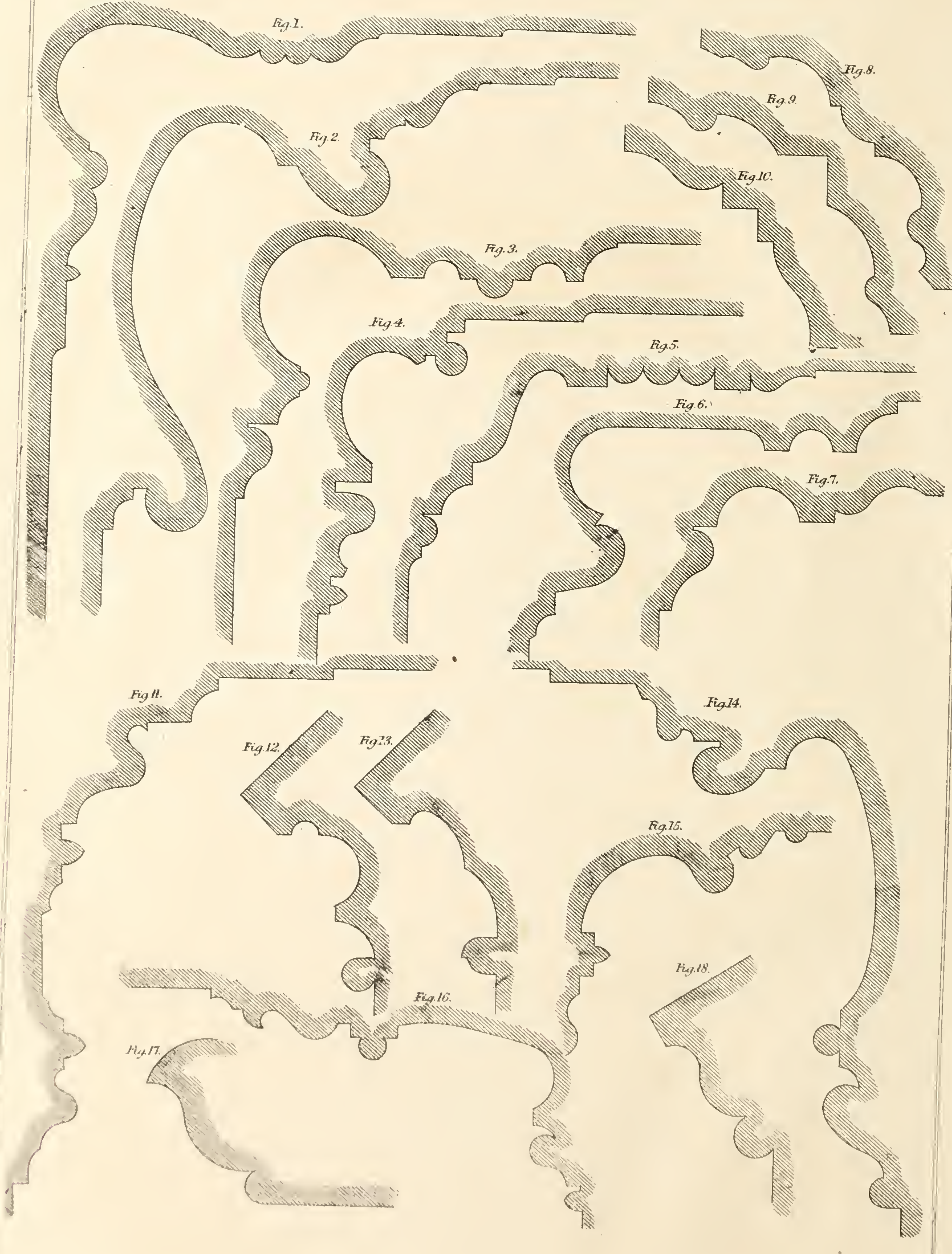
Part I.—Plane Drawing, or from "the flat."
Part II.—Solid Drawing, or from "the round."
Part III.—Elements of Geometric Beauty.

By S. Edward Warren, C. E., published by John Wiley & Sons, 15 Astor Place, New York. Price, $1.00.

This is just the book we have been looking for this some time, and from the numerous inquiries we have received from hundreds of our readers, in reference to books on geometrical and industrial drawing, we are convinced that it fills a place where a want was keenly felt, for it is just such a book as this one that our querists seemed to want.

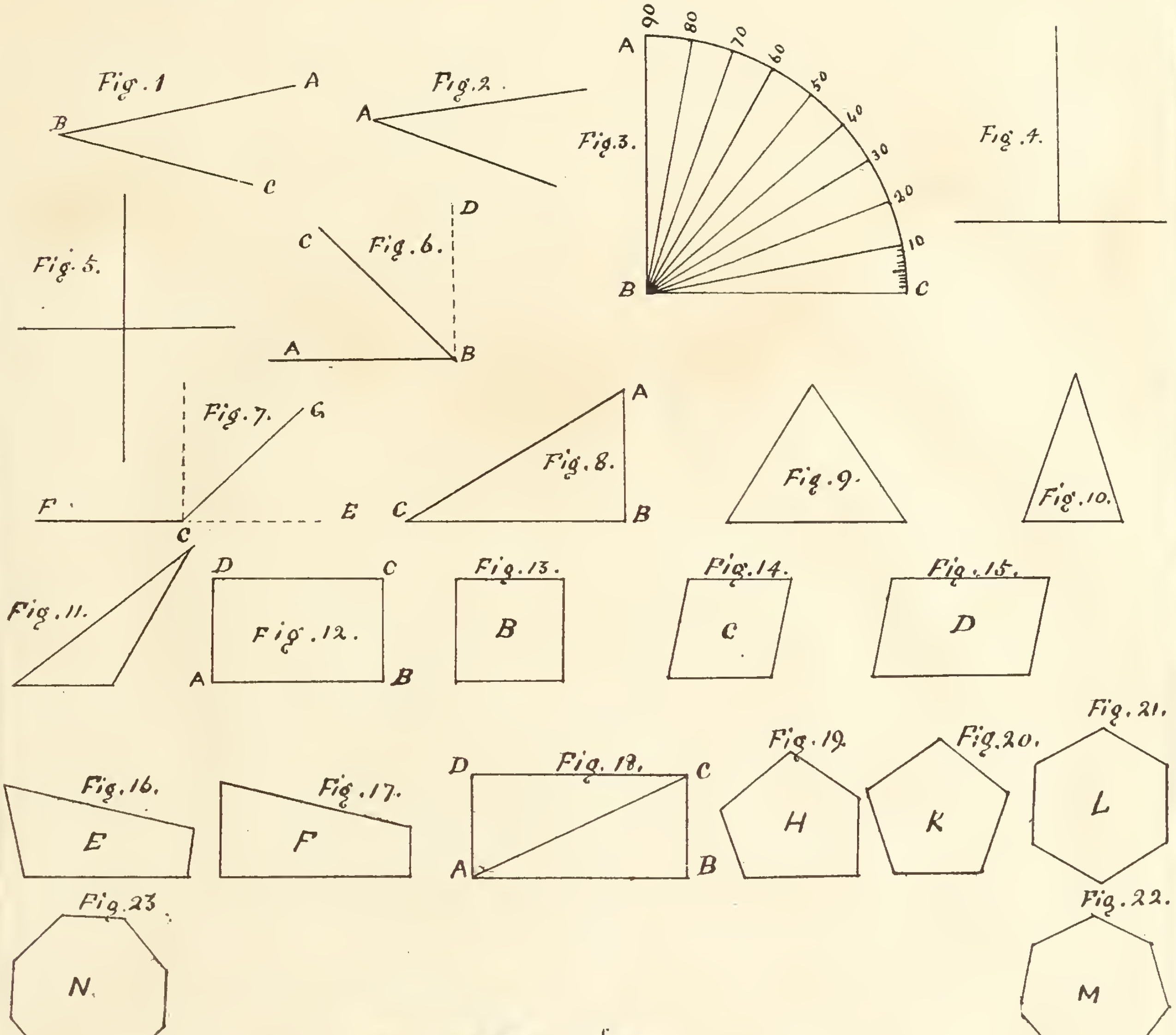
The book contains several hundred illustrated examples, showing the easiest methods of drawing objects of various dimensions. There is, also, a large number of designs for letters, with full directions for lettering in any style or shape. This department will be found of great value for progressive carpenters, who frequently have to perform an architect's duty in the preparation of plans, elevation, etc., as lettering is a branch of drawing that few carpenters or workmen builders have paid much attention to, and, as a matter of course, they are generally "weak" on this point.

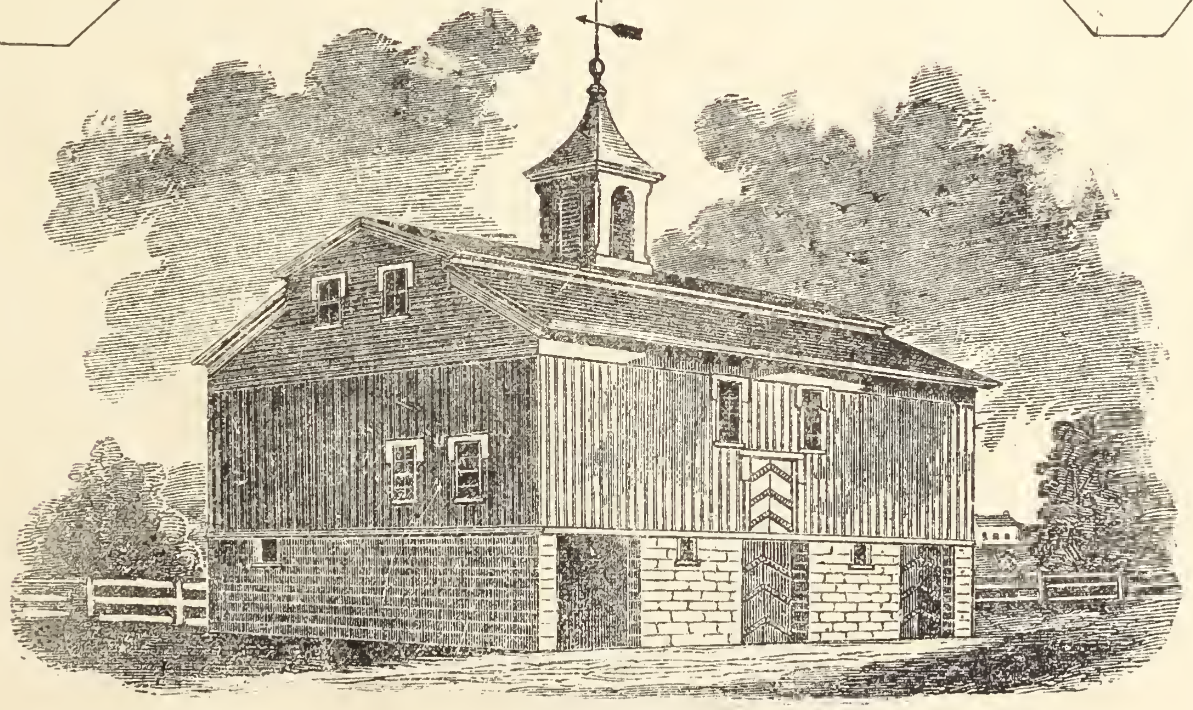
PLATE No. 45



American Builder Lith.

PLATE No. 46





A FARM BARN.

American Builder Lith.

We are glad to be able to commend this work so warmly. It is, as we have stated before, just what is needed by the practical workman, and we predict for it a large sale among skilled mechanics, when its merits become fully recognized.

The book will be sent from this office, or from the office of the publisher, post paid, on receipt of the price.

The Ethics of Spiritualism: A System of Moral Philosophy founded on evolution and the continuity of man's existence beyond the grave. By Hudson Tuttle. Published by the Religio-Philosophical Publishing House, Chicago.

Spiritualism, notwithstanding the great opposition it has met with from earnest and well-meaning people, has made great strides towards permanently becoming one of the settled creeds of the civilized world; and the book before us will do much towards dispelling the mystery that has always seemed to envelope the Spiritual question.

Mr. Tuttle is an able man, and his "Moral Philosophy" is written in a bold and vigorous style; his arguments are clear, incisive and cleverly sustained. To those who take any interest in the subject of the work, it will prove valuable reading.

OUR LITHOGRAPHIC ILLUSTRATIONS.

On Plate 43 we show a very picturesque cottage, the drawings of which were furnished us by Mr. Albert West, architect, Southville, Conn. The design possesses some features worthy of comment, such as the large front hall, which is not lessened in size by having the stairs taken out. There is a parlor without a fire place. The first floor is intended to be finished in light-colored hard woods, such as oak, chestnut, ash or maple, black walnut being considered too gloomy and sombre. The estimated cost of this building, complete, is set down at $7,000.

Plate 44 is reproduced from drawings prepared by H. R. Barber, architect, of Oshawa, Ont., for J. A. Proctor, Esq., Beaverton, Ont. The building is of white bricks, and the estimated cost is only $2,000.

Plate 45 shows a number of designs for plaster cornices, and is referred to under the head of "Plaster and How to Use It."

Plate 46 is illustrative of the article on "Constructive Carpentry," contained in the present number; it also shows a "Farm Barn," which should be built with a wall against a bank, from six to ten feet in height; it should have a drain underneath two and a half feet deep, with proper inclination, and filled with small stones, with a throat of tile at the bottom, if the soil be of a wet and springy nature. The base of the wall should not be less than three feet thick, and should be battered from the inside to width of barn sill on top; laid in lime and mortar and with one-fourth part cement, otherwise the water will ooze through the wall, rendering the air of the lower story damp and unhealthy. One thing to be noticed is that the wall built against the bank should have no projections into the earth, but should be perfectly smooth on the land side, so that when the ground is "heaved" by the frost it will not lift the stone work with it. This caution should be heeded whether the wall be laid up dry or with mortar, and much vexation and trouble will be avoided.

THE DETAIL SHEET.

Details of finish for the house shown on Plate 44 will be found on this sheet; also six designs for cheap Dormer windows, copied from "Croff's Progressive American Architecture," at the request of a subscriber. We also reproduce an illustration of a proposed new Opera House, designed by Messrs. I. B. Legg & Co., architects, St. Louis, Mo., for the St. Louis Opera House Company, and which is shortly to be built in the south-western metropolis. The estimated cost of the building is $500,000. A perspective view and plan of the Provincial Exhibition Building, Fredericton, N. B., is also shown on this sheet. The building was designed by Croff & Camp, architects, of St. John, N. B., and erected under their superintendence, and is highly creditable to the talent, taste and skill of these gentlemen. The Gate design is by Mr. Bemen, architect, No. 3 Pine St., New York City, and is well adapted for the entrance to the grounds of a country residence.

NOTES—PERSONAL AND OTHERWISE.

It is at all times pleasant for the conductor of a journal like the Builder, to feel that he has the confidence of his constituents, and the many expressions of good will and encouragement we receive weekly, are proofs that our efforts to keep the American Builder up to the highly useful position it obtained years ago, are fully recognized and appreciated by the many thousand workmen who monthly consult our pages. But while it is pleasing to know all this, it does not necessarily occur that we should relax our efforts to still further render "Our Journal" more useful and more attractive, but in order to accomplish these desirable ends, it will be necessary to make a greater monthly outlay than we can now afford; but with the advent of the coming year, we expect our subscription list to be so augmented that we shall be justified in taking another step toward the front, and we hope our friends will show by their works that their kind words and assurances are only small parts of the good will they hold towards this journal.—Mr. Boman of Spring Hill, Tenn., says: "The Correspondence, Questions and Answers columns, interest me most, though I read and digest everything in the paper. * * * * * I am glad you have commenced a series of papers on Constructive Carpentry; they will be useful to many out here. * * * * * I, for one, will never regret the day I became a subscriber for the American Builder. May it prosper and live long, is the fervent wish of a sincere friend."—Mr. P. F. Ryan of Churubusco, Ind., writes us concerning the new square, and is anxious to have one sent him at an early date. A number of other subscribers have also written us anent the square, and in reply we may say that so far we have been unable to induce any of the manufacturing firms to have anything to do with it, but we have yet to hear from several establishments, and it may be that some of them will undertake to make the new square at a reasonable price.—Mr. A. A. Rounds of Malone, N. Y., sends us a sketch of an improved "trap," which is designed to prevent sewer gas from making its way through it and entering the room wherever the "trap" is used. He calls it the American Builder Sewer Gas Trap," and is willing to let any subscriber to the Builder use it wherever "traps" are necessary. We will give an illustration and description of it next month. The "trap" really possesses some good points.—Mr. C. H. Black of Wellington, Ohio, says that the town of Wellington contains only about 2,200 inhabitants, but that the expenditure in building this year will not be less than $50,000, which sum, he says, is larger in proportion to the number of inhabitants, than has been spent for building purposes in any other town in the United States—and we believe him. "I have taken the BUILDER," he says, for three years, and it is the *boss* for *us* builders."—We have received several letters from New Zealand during the past few days, from valued subscribers, one of which we will publish next month, giving good accounts of that far off land. We wish we could induce more of our patrons in Great Britain, Ireland, Australia, Germany and the Dominion of Canada,, to send us occasional items of building news, as we are sure such correspondence would prove interesting to most of our readers. —We hope our premium list in the publisher's columns will stimulate some of our younger readers to procure for themselves a fully equipped tool chest, or a set of iron tools of the best brand, or a small library of architectural works. An opportunity like the present, to procure either of the above premiums, seldom occurs. Evidences of "business revival," may be seen in the "want columns" of the New York papers daily; fifty carpenters were advertised for in the *Sun's* columns last week, and painters, plasterers, masons and bricklayers have been in good request during the last month. We have waited long, but the dawn is breaking at last, and let us hope the full sunshine is near at hand.—We have received the "premium chest" from Mr. Wheeler's establishment, and we can assure all our readeas that it is a handsome one, and we herewith invite any of them who may visit this city within the next three months, to call at this office and see it for themselves, as they may learn something with regard to "tool chests" that may be of value.—Will our valued correspondent "Alonzo" send his full address when next he writes us?

◆

HOW TO CALCULATE SPEED.

The following rules are taken from First and Pryibils' trade circular, and will prove useful to those of our readers who have the management of wood-working machinery.

To find the speed of a countershaft; if the revolutions of the main shaft and size of pulleys are given: Multiply the revolutions of the main shaft by the diameter in inches of the pulley and divide by the diameter in inches of the pulley on the countershaft, the quotient will be the number of revolutions.

EXAMPLE.—What will be the speed of a countershaft with a 12 inch pulley driven by a 30 inch pulley 180 revolutions per minute; 180x30÷12=450.

To find the size of a pulley required, if the number of revolutions and size of pulley on the main shaft are given: Multiply the diameter in inches of driving pulley by the revolutions of the main shaft, and divide by the speed required; the quotient will be the diameter in inches of the pulley.

EXAMPLE.—What will be the diameter of a pulley to make a countershaft turn 450 revolutions per minute, driven by a 30 inch pulley 180 revolutions per minute; 180x30÷450=12 inch pulley.

To find the size of a pulley for a main shaft, if the speed of shafts and diameter of pulley on the countershaft are given: Multiply the diameter in inches of pulley by speed of the countershaft, and divide by the revolutions of the main shaft; the quotient will be the diameter of the pulley.

EXAMPLE.—What will be the diameter of a pulley on a main shaft making 180 revolutions per minute, to drive a 12 inch pulley 450 revolutions per minute; 450x12÷180=30 inch pulley.

RULE TO FIND THE NOMINAL HORSE POWER OF STATIONARY ENGINES.

Multiply the area of the piston by the average pressure in lbs. per square inch. Multiply this product by the travel of the piston in feet per minute; divide by 33,000; this will give the horse power.

For the *actual* horse power deduct from the above (according to the size of the engine) from 30 to 60 per cent. for: Loss by radiation, friction of the working parts, friction of the steam in the steam pipes and steam passages, back pressure of exhaust. For engines from 20 to 60 horse power, an average of 50 per cent. may be deducted, and a greater amount as the size of engine decreases.

DRIVING POWER OF BELTS.

A belt 1 inch wide, properly applied, and running 750 feet per minute, is considered to transmit one horse power. A 2 inch belt, under the same conditions and speed, transmits more than twice that of the 1 inch. The ratio of increase is about as follows: A 2 inch transmits twice that of the 1 inch, with $\frac{1}{8}$ of the first inch in addition. A 3 inch drives one and a half times that of the 2 inch, with $\frac{1}{5}$ of the 2 inch added. A 4 inch transmits $\frac{1}{3}$ more than the 3 inch, and about $\frac{1}{10}$ of the 3 inch in addition, and so on in a continuous proportion.

As double belts can be strained tighter on the pulleys without breaking, they will transmit about $\frac{1}{4}$ more power than single belts.

WASTED POWER.

As much as 50 per cent. of the driving power is often wasted by improper conditions in the shafting. Among the most prominent faults we have found are: Shafting too light, or crooked; hangers too far apart; bearings too short; pulleys too heavy; pulleys not balanced (which sometimes damages the building); hangers which are not adjustable, nor self-adjusting, or filled with spurious lining, and out of all proportion, one to the other, for the allotted duty.

FRICTION PULLEYS, OR BELT TIGHTENERS.

We generally find these pulleys too small in diameter—hence running too fast, wearing out quickly, and wasting power. They should, whenever it is possible, be placed to bear on the slack side of the belt, that is to say, the side which describes the forward motion from the driving pulley.

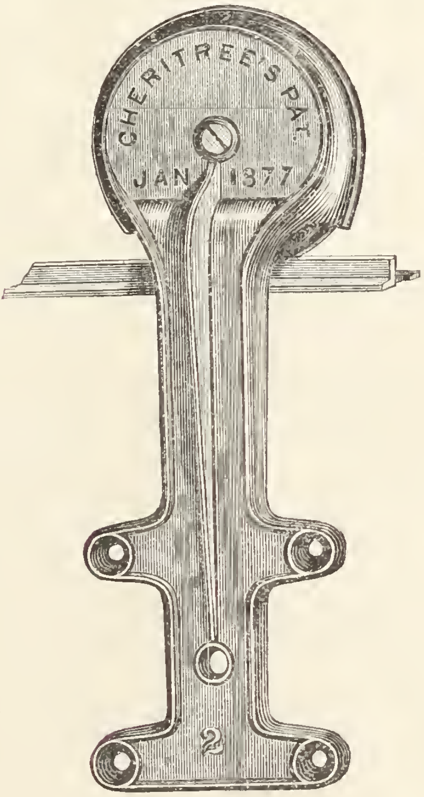
PLACING OF SHAFTS.

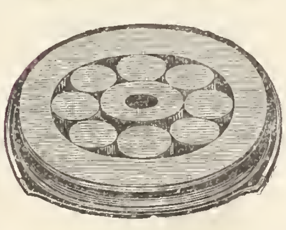
Line shafts, running at an angle one to another (situated on different floors), running at quick speed, and transmitting much power, and requiring to run noiselessly, are usually driven by a half twist belt. Such belts do not transmit the full amount of power due to their widths. They wear out very rapidly, especially when the distance between the shafts is short, and give trouble wherever used. We have achieved perfect success by applying angular belts, and we confidently recommend them, beyond question, as the best device that can be used under the above conditions, provided that they are properly applied, and that the sizes of the pulleys and thickness of the belt are correctly proportioned.

Lines of shaft running at an angle one to the other, and on the same floor, and requiring to run noiselessly and at a quick speed, should be provided with two loose pulleys, or idlers, running on an upright shaft, the latter being fastened to a step plate or stand on the ceiling, and if much power is transmitted, one or two stay bars may be advantageously applied. By this means the belt may have only a quarter, instead of a half twist. The pulleys on the upright shaft should not be too small, and should have long bearing hubs. This plan always gives complete satisfaction.

ANTI-FRICTION BARN DOOR HANGERS.

We give below two cuts of Cheritree's Patent Barn Door Hangers, and in view of the fact that we have had several inquiries of late regarding "Barn Door Hangers," we think it will interest some of our readers to be made aware of the fact of there being such first-class goods in the market as those now under discussion. The chief peculiarities of the Cheritree patent that recommend themselves are, first, that the sheave or pulley is encased in a cap, which prevents rain, snow, or ice from coming in contact with the working parts; second, the axis is set in chilled iron friction rollers, one working on the other in succession, with a circular rim around the whole—"or a wheel within a wheel"—which permits of the whole being worked with very little outlay of strength.





There can be no doubt about this "Hanger" being the best in the market, and it only requires to be known to the farmer and builder to become generally adopted where "hangers" are at all used, as they are durable, well finished and easily put on. They cost but little, and never fail to give entire satisfaction to those who have made use of them.

Further particulars can be obtained by addressing the Cheritree Hardware Co., 97 Chambers street, N. Y.

PUBLISHER'S NOTES.

Mr. E. A. Wheeler, of Cassville, N. Y., has made a first-class tool chest after the plans published in the Builder in June last. This chest will be fully stocked with joiners' tools of the best make, and will be worth, with tools included, not far from ONE HUNDRED AND FIFTY DOLLARS. Now, we propose to give this complete carpenter and joiner's outfit to the person who will send us the greatest number of new yearly subscribers and the cash, on or before the first day of February, 1879.

This is a splendid offer, and any active man, whether master builder, journeyman, or apprentice, who would be willing to devote a few hours in each week to canvassing, would almost be sure of obtaining this prize.

The chest is built of white pine, with panelled ends, brass bindings, panelled lid and walnut drawer fronts. The trimmings are all first-class, and the whole will be put in good working order. The body of the chest outside is oiled and varnished with shellac varnish. The chest alone is well worth from thirty to forty dollars. We shall stock it with one full set of iron bench planes, Leonard Bailey's make, one set of chisels, one set of gouges, one set of gauges, four saws, squares, block plane, plow, compass plane, hammers, level, two bevels, three screw-drivers, oil stone, oil can, rebate planes, bead planes, brad awls, scratch awl, chalk and line, pliers, compasses, brace and bits, extension bit, compass saw, and a hundred other little etceteras that go to make up a joiner's complete "kit."

For the next highest number sent us we will give FIFTY DOLLARS' worth of the Leonard Bailey Co.'s tools; and for the third highest number we will give TWENTY-FIVE DOLLARS' worth of the same maker's tools. For the fourth highest number sent us we will give FIFTEEN DOLLARS' worth of tools. The tools in all cases will be from the manufactory of the Leonard Bailey Co., and of course will be of the best brand. Parties willing to canvass on the above conditions will please to send their names and address to this office, and they can immediately begin to take subscriptions and forward them to us, and we will credit them with every name sent us. A limited number of subscriptions can be taken for back numbers of the present year, but we prefer new subscriptions, to commence with the first of January of the coming year.

Our club rates will be the same as they were last year, namely, $2.50 for each subscriber; but in no case will we accept less than two subscribers and $5.00 under the above conditions.

Single subscriptions will remain as heretofore, $3.00 per annum.

Besides the above liberal offers we will give, to those who prefer, the following books:

For ten subscriptions and $25.00 we will send "Lakey's

Village and Country Houses," price $5.00, or "Palliser's American Cottage Homes."

For twelve subscribers and $30.00 we will send "Croff's Progressive American Architecture," price $6.00.

For fourteen, sixteen, eighteen or twenty subscriptions, and $35, $40, $45 or $50, we will send architectural books to the value of $7, $8, $9 and $10 respectively.

Any carpenter or joiner who is desirous of obtaining a good supply of architectural books, can do so now with very little exertion. Remember, we do not want any one to work for us for nothing; we are willing to pay liberally for actual results; and should any of our readers prefer cash commissions for their work, let them write to this office, stating that they would prefer cash, and we will send them terms and other particulars.

The times are certainly changing for the better, and it is in the nature of things that with the revival, the building trades will receive a new impetus, and the trowel, hammer and mallet will soon be heard in fitting harmony, from one end of the land to the other. With this revival of busy times it is but reasonable to suppose that the Builder will also prosper, increase its influence, and add thousands to its subscription list. Let each of our friends do what he can towards making this Brotherhood 50,000 strong, and his labors will most assuredly be amply rewarded.

Parties subscribing for the year 1879, under the above conditions, during November, will be entitled to the November and December numbers of the present year; thus getting fourteen numbers for the price of twelve.

Building Notes.

We shall feel obliged to our readers who will favor us with brief notes of works contemplated or in progress throughout the Continent, naming the owners, architects and contractors.

$10,000 is going to be expended on a jail in Galena, Ill.

Mr. G. P Randall, Architect, will furnish the plans and specifications.

The famous leaning tower of Pisa, Italy, has been repaired and restored.

Paris has 65,000 houses, London 460,000 more than Paris, Berlin, Vienna, and New York combined.

H. C. Meyers, Esq., of Holly Springs, Miss., is building a cottage at that place. W. L. Jones, Architect.

Messrs Porter & Price are just completing a fine Court House for Lake County, Ill., Mr. H. C. Kock, of Milwaukee, Architect.

Robinsson, Rea & Co., Pittsburg, Pa., have constructed a fire-proof building near their works, which will be used as a depository for patterns.

A four thousand dollar school-house is being erected at Holly Springs, Miss. It is to be a brick building, two stories high with a half-octagon tower in front for porch and entrance way. W. L. Jones, Architect.

The most important piece of Roman sculpture ever found in London was lately excavated. It is believed to have formed a part of mausoleum. London was a large city, with a mint and other metropolitan institutions, even in Roman days.

A memorial window to the late Rev. Albert Barnes is to be placed in the Walnut Street Presbyterian Church in Philadelphia.

At Lake Forest, Ill., a college has just been completed at a cost of $20,000, S. C. Welch, Architect, Messrs. Studley, and Warner, builders.

Mrs. Mark Hopkins, widow of the California millionaire, has given $1,000 dollars for furnishing the chapel of the church at Great Barrington, Mass., her native place.

Mr. Schliemann, the explorer of the ruins of Troy and Mycenæ, claims to have discovered the ruins of the ancient capital of Ulysses' kingdom of Ithaca. No notable object of art has yet been excavated.

After a lapse of about eighteen months and an expenditure of about £15,000, Cleopatra's Needle has at length been erected on the site finally chosen—the Adelphi Steps. The Queen sent a congratulatory message by telegram.

The *Scientific News* makes the following alarming announcement in an editorial: "Not one house in five hundred, built either in this or any other city, provided with sewers, is, in a sanitary point of view, a fit dwelling place for human beings."

Dr. N. M. Compton, late Superintendent of the State Lunatic Asylum, Mississippi, is building a private insane asylum on his farm near Holly Springs, Miss. The building is to be similar in size and plan to the State Asylum of Connecticut.

£50,000 will be the cost of the restoration of the dome of St. Paul's Cathedral. A series of reflectors, hidden in odd corners, will reduce the darkness to one-half, and thus bring to view the pictures in mosaic work, which will have much gilding and brilliant coloring.

To make a cellar bottom water-proof against tide make an inverted brick arch of slight curvature, coat in with pitch, lay over it a course of brick, and upon the brick place a layer of from three to six inches of broken stone, and grouted with hydraulic cement and sand and gravel.

The general employment of iron in modern days for the purpose of construction in buildings, is owing to its strength, elaticity, toughness and durability, qualities which obviate many difficulties otherwise insuperable. Great care is required, however, to avoid the violation of good taste.

Among the additions and improvements which have been made during vacation weeks at Harvard College is the partial completion of the new gymnasium building, near the scientific school buildings. It will not, however, be finished before another year. The books have been removed from the old part of the library to the new wing. The old library is to be remodeled and made fire-proof.

Upon the grounds of Bellevue Hospital a new building is nearly completed, which is to be used for surgical operations alone. It is a one-story building, 135 feet in length by 35 feet wide, and is located south of the western wing of the main hospital. The total cost of this new hospital is about $20,000; and this expense is paid by William H. Osborne, a benevolent citizen of New York. Another building is to be erected on the grounds of Bellevue for the accommodation of insane patients, and $10,000 have been appropiated to this purpose. It will contain twenty rooms, and be so constructed that the inmates will have plenty of sun and air.

The following buildings are now going up in Wellington, Ohio, the greater portion of the work being done by C. H. Black, builder, of that town. The buildings are: A livery stable, cost $5,000; a block of stores, cost $7,500; a church, cost $22,000, and several dwellings ranging in cost from one to five thousand dollars each; also a carriage factory at a cost of from five to ten thousand dollars.

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Mr. Bomen, of Spring Hill, Tenn., sends the following method of obtaining the required number of studs for any given length of wall. *Rule.*—Multiply the length of wall by 3 and divide by 4, adding one to the result thus obtained, and your studding will stand just 16 inches from centers.

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THE FIRE ON THE HEARTH.

Not long since, the editor of the Builder visited some of the quaint old farm houses of northern New Jersey, houses that were built in the revolutionary days. Everything about them was interesting; the solid walls, the great chimneys, the queer cupboards, and yet in one particular, almost without exception, they were disappointing. The old fire places were sealed up. The modern stove, the saddest thought of the inventive genius of this century, with its cheerless influence, its dry and "stuffy" atmosphere, was found everywhere. It was a gloomy suggestion, indeed, and one could but think of all the brightness and joy of life that had gone with its coming. The stove and the furnace are symbols of darkness. There is joy in the open fire.

Of course, it is not to be disputed that as population increases there is greater necessity for economy in the use of fuel; and Franklin, who was always studying to make money go as far as possible, was the first to attempt a compromise between the crude open fire and the close stove which shuts out the light. He succeeded but partially. He retained something of the old cheerful blaze, but his stove failed in heating qualities. And yet, we have had until of late, no better substitute for the old-fashioned fire-place than the "Franklin," and in looking at those sealed-up New Jersey fire-places, just a stone's throw from New York, we were led to wonder whether our Jersey friends had really ever heard of The Fire on The Hearth, not a compromise, but an improvement upon "The Franklin" idea, in fact more than a substitute for the old glory of the revolutionary period; a stove that gives both light and heat, and at the same time supplies ventilation; in short, a single apparatus which combines the sanitary advantages and cheer of the old fire-place, the economical combustion of the close stove and the air circulating power of a furnace, without the disadvantages of either. The readers of the Builder have had their attention called to this subject before, but if they have never seen one of these stoves in operation they can scarcely appreciate the important part they are yet to play in heating our dwellings. The Fire on The Hearth is an inspiration. In ordinary dwelling houses it at once does away with all base burners, and their name is legion, and the furnace as well. What the base burner can do The Fire on The Hearth does, and with less fuel, and it does a great deal more. It admits of the introduction of air from without; the air is not vitiated by overheating; it flows to all parts of the room and equalizes the temperature from end to end; and there is an open fire. It has been thoroughly tested and has received the emphatic approval of the highest scientific and practical authorities both in this country and in Europe; its manufacturers have been awarded medals for superiority at the U. S. Centennial Exhibition, 1876, and at the Paris Exposition, 1878, and at numerous State and County fairs. The base burner gives but a faint token of light in comparison, and gives no ventilation.

Where the builder has wickedly put up a suburban house without fireplaces—and this the sinful builder is all the time doing—it is not the best thing to do to put in a furnace. These modern stoves are better in every way, and they can be placed so as to act as substitutes for a furnace and without additional expense. We would call the especial attention of architects and builders to the new Fire-place Heater for mantels, built upon the identical plan of the Fire on the Hearth stoves, and intended also for heating rooms upon an upper floor when required. It is the only device we know of which is perfectly adapted to wood and soft coal fuel as well as anthracite.

It is cheaper than a furnace, more economical than a stove, and as healthful as a fire-place; and sufficiently ornamental and attractive to satisfy the most cultivated and fastidious taste. We do not for a moment hesitate in advising all who are building dwelling houses to examine this matter for themselves, assured if they do they will arrange chimneys and flues with a view to having a Fire on The Hearth. Full particulars can be had by adressing Open Stove Ventilating Co., 115 Fulton st., New York, for their testimonial pamphlet and descriptive circulars.

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INDUSTRIAL NOTES.

Fifteen hundred women and girls work in printing offices in New York City.

From Buffalo we learn that parties are preparing to start up the old Union Iron Works of that city.

Lord Rosebery made a brilliant speech on the opening of a new school of Science and Arts in Scotland.

The Altoona Iron Company will probably put up another guide mill for the exclusive manufacture of hoops.

The Manchester, England, City Council have decided to open the free libraries and reading-rooms of the city on Sunday.

The Hartford Spring and Axle Co. have been incorporated at Norfolk with a capital stock of $15,000, divided into 600 shares of $25 each.

The managers of the window glass works at Bellaire, O., have abandoned the 20 per cent. reduction on the blowers' wages, but refuse to pay the cutters extra for sorting lights.

Messrs. Meenly & Kimberly, of Troy, received an order last week for a bell for a mission church in the interior of Africa. The order states that this will be the first bell in that portion of Africa.

The Presbyterians are building in Philadelphia what, when completed, will be the largest church of their denomination in that city. It is to be called the Collegiate Free Chapel, and there will be but a small debt to raise when it is ready for dedication.

A Scotch correspondent says: American enterprise is showing itself in Scotland in a variety of ways. Every grocer's shop shows a stock of canned goods equal to any "cash grocery" in New York or New Jersey.

Mr. William Astor has had his residence on Fifth avenue and Thirty-fourth street magnificently frescoed during his absence in Europe, and the workmen are now adding the finishing touches. The designs are new and exceedingly beautiful, unlike anything of the kind, we believe, in the city.

On the north side of the St. Gothard tunnel one thousand men are employed underground, and four hundred in the open air. Three hundred wagon-loads of earth are excavated every day, and in the daily blastings six hundred pounds of dynamite are used. The energy shown on the Italian side is said to be equally great.

The Paris correspondent of the London *Economist* says that there is no doubt that the Legislature will adopt the scheme of public works for 1879 which the Minister proposes. These will cost $800,000,000. The cost will be raised by an issue of 3 per cent. rentes,redeemable in seventy-five years. This will absorb much of the immense sums now idle in bankers' hands.

Messrs. Barney & Kilby, proprietors of the Fulton Machine and Foundry Works at Sandusky, O., are running full time, employing about 60 men. They have lately received some very large orders, among which are one 125-horse-power engine, two engines with boilers complete of 30-horse power; one 40 and one 50-horse engine, with boilers and fixtures complete, besides three or four flouring mills.

Mr. Flood, one of the marvellously rich men of the Pacific coast, is building a private residence in San Francisco that will cost two million dollars. The furniture is being manufactured in this city, and the contract is rumored to be for $175,000. It is to be made of rosewood, ebony and sandal wood and upholstered in satin, velvet and brocade, manufactured especially for Mr. Flood, who is going to deluge his house with richness.

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USEFUL AND SUGGESTIVE.

Wind moves at the rate of 90 to 100 feet per second.

The more emery paper has been used the better it is for polishing.

Strange as it may seem, a boat can be propelled by a wind-mill even when the wind is against the craft.

To remove a glass stopper that has become firmly fastened in the neck of the bottle, put a drop or two of glycerine or sweet oil in the crevice about the stopper, and in an hour or two it will be loose.

The new result of the experiments to determine the mechanical equivalent of heat, conducted by Dr. Joule and others, confirm the old one. It gives 772.55 foot pounds as the equivalent at the sea level.

Cast-iron Pipes, 15 inches in diameter and ¾ inch thick, will sustain a head of water of 600 feet. One of oak, 2 inches thick and of the same diameter, will only sustain a head of 180 feet.

Car Wheels made from paper are subjected to enormous pressure, and enclosed between thin plates of iron. Such wheels are found to have extraordinary elasticity and endurance, and are much used. Messrs. John Brown & Co., of Sheffield, manufacture them for this and other countries.

Good petroleum should have the following characteristics: 1. The color should be white or light yellow with blue reflection. 2. The odor should be faint and not disagreeable. The specific gravity at 60° Fahr. ought not to be below 0.795, nor above 0.84. 3. When mixed with an equal volume of sulphuric acid, of the density of 1.53, the color ought not to become darker, but, on the contrary, lighter.

Surfacing Sheet Iron.—The invention of Mr. C. J. Eames, of New York, relates to a process in which iron sheets, during rolling and finishing, have produced upon them a black or blue-black glossy film or coating that is highly resistent to corrosive agencies, does not tarnish in the air, and is capable of being planished by rolling or hammering the sheet without detachment therefrom.

To silver cast iron, 15 grains of nitrate of silver are dissolved in 250 grains of water and 30 grains cyanide of potassium are added; when the solution is complete the liquid is poured into 700 grains of water, wherein 15 grains of common salt have been previously dissolved. The cast iron intended to be silvered by this solution should, after having been well cleaned, be placed for a few minutes in a bath of nitric acid of 1·2 specific gravity just before being placed in the silvering fluid.

A writer in a foreign technical journal expresses a decided preference for soapstone powder, in the form of dust, as a lubricant for the axles of machines. For this purpose it is first reduced to very fine powder, then washed to remove all gritty particles, then steeped for a short period in dilute muriatic acid, in which it is stirred until all the particles of iron which it contains are dissolved. The powder is then washed in pure water to remove all traces of acid, after which it is dried, and is the purified steatite powder used for lubrication. It is not used alone, but is mixed with oils and fats, in the proportion of about 35 per cent. of the powder added to paraffine, rape, or other oil; or the powder may be mixed with any other of the soapy compounds employed in the lubrication of heavy machinery.

Steel wire strings of pianofortes are very commonly annealed by making the wire red-hot and then plunging it into boiling water. Ordinary experience would suggest that this must harden the steel in some degree, but it has been tried upon many samples of steel—including mild Bessemer steel, shear steel of different qualities, and the hardest Sheffield crucible steel—and it was found that in every case, when the operation was properly performed, the steel was remarkably annealed. Samples have been cut from the same bar—one heated and slowly cooled by burying in ashes under a furnace grate, the other by immersion in boiling water—and proved that when subjected to bending tests those which had been cooled in the boiling water would bear more severe flexure without cracking than the pieces which had been more slowly cooled in the ashes. They were not so soft, but were tougher and more reliable when subjected while cold to violent bending blows of a hammer. It is said to be more effectual than "oil toughening" or slow cooling.

Much of the wretchedness experienced by dwellers in tenements is occasioned by the unhealthy or disagreeable condition of the tenement. The rooms are unventilated and dark, the halls are close and dingy, the roof leaks, the chimney is choked. This would not be so were the sanitary and building laws enforced. Why are they not enforced? One reason is that not one tenant in a score knows what they are. If his waste pipe clogs he has to await the landlord's pleasure before it is fixed. It does not occur to him that he may compel the immediate fixing of it; he is ignorant of his rights. Recognizing this fact, the Association for Improving the Condition of the Poor has compiled a pamphlet in which are the laws affecting tenements and lodging houses, intending it for distribution among those whom these laws most concern. It will do good.

In making steam motors of all kinds, the tendency has been of late to construct engines with a high piston speed. By a high initial speed in the motor, much of the gearing needed to obtain speed in the machinery that it moves is dispensed with. The steam is more thoroughly employed, and the size and weight of the engine for a given power are reduced. The most important improvement in this direction has sprung from a radical change in the construction of the steam cylinder and its moving parts. The cylinder is increased in length and reduced in diameter, and in place of one, there are two pistons, designed to move in opposite directions. The first piston has a rod passing through the center of the second, and the second piston has two rods, one on each side of the central rod. Each piston has its piston-rod connected with a crank on a three-throw crankshaft. These cranks are placed opposite each other, the single rod of one piston balancing the two of the other. It will be observed that, by this change in the construction of the engine, the pistons must travel in opposite directions, each making a to-and-fro excursion over half the length of the cylinder. For instance: If the two pistons are each at one end of the cylinder, the steam may be admitted behind them both, and thus drive them together. When they meet at the center, the steam enters at a central port and drives them apart till they reach their original positions, when the excursion is finished and one revolution of the crank is accomplished. The effect of this disposition of the moving parts is to create a perfect balance in the reciprocating action of the engine. The pull of one piston balances the thrust of the other. It is no longer a series of pulls and thrusts, as in the ordinary engine, but a resulting motion of the combined pull and thrust of the two pistons. The advantages obtained by this balancing of the pistons are found in the reduced length and weight of the connecting-rods and the bed-plate of the engine, steadiness of motion, as there is no pull or thrust on the shaft and its bearings, a higher speed and greatly increased power. As there is no straining between the cylinders and the shaft, the engine rests securely on its bed. As the two pistons travel over only one-half of the length of the cylinder in the same time, and as the area of the piston surface is double that of a single-piston engine, the power is more than doubled for a given speed. The strain caused by the expansion of the steam between the piston and the end of the cylinder, as in the ordinary engine, in the balanced engine is spent on the two ends of the cylinder in one-half of the stroke, and between the two pistons in the other half. In either case the strains are exactly balanced. Thus the engine may run at a high speed without producing a troublesome jarring or shaking of the motor. In marine work it is thought the balanced engine will prove of advantage, as it may be driven at a high speed without shaking the ship, and by giving the engine a higher speed, a screw of more effective pitch may be employed. The only disadvantages found in this form of motor lie in the multiplication of the connecting-rods and stuffing-boxes, but these defects are more than balanced by the steadiness and increased speed and power of the engine.—[" *The World's Work;*" *Scribner for Oct.*

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Miscellaneous Notes.

It is asserted by *Punch* that American babies crawl out of their cradles, take critical surveys of them, invent improvements, and obtain letters patent.

If farmers would keep a slate hanging up in barn or workshop, with a pencil attached by a string, so as to note down work to be done on stormy days, it would be found to be of great advantage.

A traveling fortress, an iron clad coach, is now running on the Cheyenne and Black Hills stage path. It is made of thick boiler iron, with four port holes, is bullet proof, carries two well armed guards inside, and runs for the sole purpose of transporting bullion for the California quartz mills.

Notwithstanding iron is more used for architectural purposes in America than elsewhere, it is not always used in such a manner as to render the building fire-proof. Corrugated iron roofs are only a good protection against sparks, but they yield readily to any more intense heat; and in this respect heavier cast-iron plates are safer, notwithstanding in the end they yield also when the intense heat to which they are exposed is of long duration.

A writer in the *Rural Home* says: "I have just made gates to replace some old-fashioned pairs of bars that I am heartily tired of opening and shutting. They are cheap, durable and very easily made. Each gate is twelve feet in lenght by four feet in height. Five boards four inches wide are used, besides battens and braces. Battens should be placed on both sides, making three thicknesses to nail through. It does not take more than thirty-three feet of boards, worth, perhaps, sixty-six cents, to make each gate. Add to that ten cents for nails, and the value of one hour of your time, and you have the whole expense. A gate of this kind will outlast a framed one costing $4, and, as no hinges are used, that expense is saved also. It is held in position by means of a stake driven in the ground four or five inches from the post; not in a straight line, but a little more than the thickness of the gate towards the drive-way, so that, when opened, the gate can be turned half way round, and be parallel with the drive-way. It is kept a few inches from the ground by a strip, nailed to both stake and post, on which one end rests when shut, and on which it slides half its length, and then swings round as on a pivot when opened. The strip is usually placed under the second board, in a space arranged for it, by cutting away two of the battens. This strip takes the place of hinges. A gate of this kind can be made in much less time and at as little expense as a pair of bars, and is certainly much more convenient."

BUILDING MATERIALS.

Compiled and Revised for the AMERICAN BUILDER.

THE NEW YORK MARKET.

Wholesale Prices.

BRICK.—Cargo afloat.

Pale ⅌ M.	$2 25 @ 2 50
Jersey	@
Long Island	@ 3 50
Up-River	3 50 @ 4 12½
Haverstraw Bay, 2ds	4 00 @ 4 25
Haverstraw Bay, 1st	4 12½ @ 4 25

CEMENT.

Rosendale ⅌ bbl.	$ 80 @ 90
Portland (Imported)	2 75 @ 3 15
Portland (Saylor's American)	2 50 @ 2 90
Roman	2 80 @ 3 25
Keene's coarse	6 50 @ 7 00
Keene's fine	10 00 @ 10 50

FIRE BRICK.

Red Welsh	$35 00 @ 36 00
Scotch	26 00 @ 30 00
American	25 00 @ 30 00

DOORS.

RAISED PANELS, TWO SIDES.

2.0 x 6.0	1¼ in.	$0 75
2.6 x 6.6	1¼	1 05
2.6 x 6.8	1¼	1 10
2.8 x 6.8	1¼	1 15

MOULDED.

Size	1¼ in.	1½ in.	1¾ in.
2.0x6.0	$1 37		
2.6x6.6	1 69	$2 14	
2.6x6.8	1 73	2 16	
2.6x6.10	1 76	2 23	
2.6x7.0	1 80	2 32	
2.8x6.8	1 80	2 32	$2 85
2.8x7.0	1 88	3 41	2 99
2.10x6.10	1 98	2 51	3 45
3.0x7.0	2 07	2 71	3 33

BLINDS.—OUTSIDE.

Per lineal foot, up to 2.10 wide	$ @ $ 24
Per lineal foot, up to 3.1 wide	@ 0 27
Per lineal foot, up to 3.4 wide	@ 0 30
Per lineal foot, painted and trimmed	0 40 @ 0 50

INSIDE.

Per lineal foot, 4 folds, Pine	$ @ 0 50
Per lineal foot, 4 folds, Ash or Ches'n't	@ 0 80
Per lin. ft., 4 folds, Cherry or Butt'r'n't	@ 0 95
Per lineal foot, 4 folds, Black Walnut	@ 1 15

WINDOW FRAMES.

Up to 3.4x7.2, put together	@ 2 30

HAIR—Duty free.

Cattle ⅌ bushel	$ @ 0 10
Goat	@ 0 12½

LATH—Cargo Rate ⅌ M	1 35 @ 1 40

LIME.

State, common cargo, rate ⅌ bbl.	$ 60 @ 65
State, finishing	80 @ 90
Rockland, common	75 @ 80
Rockland, finishing	— @ 90
Ground	80 @ 85

Add 25 c. to above figures for yard rates.

LUMBER.

Pine, choice, extra dry, ⅌ M.	$50 00 @ 60 00
Pine, good	45 00 @ 50 00
Pine plank, 1¼ 10 in., dres'd ea	40 @ 43
Spruce boards, dressed	20 @ 23
Spruce plank, 1¼ in., dressed	25 @ 28
Spruce plank, 2 inch	35 @ 38
Spruce timber ⅌ M.	16 00 @ 19 00
Hemlock boards each	14 @ 16
Ash, good ⅌ M	38 00 @ 45 00
Oak	38 00 @ 45 00
Chestnut	42 00 @ 48 00
Walnut, black, good to choice	85 00 @ 100 00
Walnut, black, ⅝	75 00 @ 85 00
Walnut, black, choice seasoned	110 00 @ 150 00
Cherry, good ⅌ M	50 00 @ 80 00
Whitewood, chair plank	60 00 @ 70 00
Whitewood, inch	40 00 @ 50 00
Shingles, ex. shaved pine, 18 in., ⅌ M	9 50 @ 10 00
Yellow pine dressed flooring	30 00 @ 37 50

STONE.—Cargo rates delivered.

Amherst freestone, in rough...⅌ C ft.	$ @ 85
Berea freestone, in rough	@ 95
Berea freestone, in rough	@ 75
Brown stone, Portland, Ct	1 25 @ 1 50
Brown stone, Belleville, N. J	1 00 @ 1 50
Granite, rough	60 @ 1 25
Canaan marble	1 25 @ 1 50
Dorchester, N. B., stone, rough (currency) ⅌ foot.	@ 1 00

PAINTS AND OILS.

Whiting ⅌ 100℔	40 @ 85
Paris white, Eng. (gold)	1 75 @ 1 87½
Zinc, white, American, dry ⅌ ℔	5 @ 5½
Zinc, white, American, in oil, pure	6 @ 9
Lead, white, American, in oil, pure	7¼ @ 7¾
Lead, red, American	7¼ @ 7¾
Litharge, American	6 @ 6½
Ochre, French, dry (gold)	1 50 @ 1 60
Ochre, in oil (currency)	6 @ 15
Venetian red, English (gold) ⅌ cwt	1 50 @ 1 75
Vermilion, Am. Quicksilver (gold)	55 @ 60
Vermilion, Trieste (gold)	80 @ 90
Chrome, yellow, genuine, dry	15 @ 40
Chrome, yellow, in oil	18 @ 28
Paris green, pure, dry	18 @ 22
Putty, pure ⅌ ℔	2 @ 2½
Sienna, raw (American)	2½ @ 3
Sienna, burnt (American)	7½ @ 8
Sienna, burnt, in oil	10 @ 20
Sienna, raw, in oil	11 @ 25
Umber, raw, in oil	10 @ 18
Black, lamp, ordinary	10 @ 18
Black Paint, in oil, kegs	@ 8
Black Paint, in assorted cans	@ 11

SLATE.—Delivered in New York.

Purple roofing slate ⅌ square	$6 00 @ $7 00
Green slate	6 00 @ 7 00
Red slate	10 00 @ 11 00
Black slate, Pennsylvania (at Jersey City)	5 00 @ 5 25
Peach bottom (nominally)	8 00 @ 9 00
Tiles, 1¼ in., rubbed, ⅌ sq. ft. delivered	20 @ 25

TIN PLATES.—Duty, 1 1-10 c. ⅌ ℔.

I. C. charcoal, 10x14 ⅌ box (cur.)	$6 00 @ 6 75
I. C. coke, 10x14	5 00 @ 5 75
I. X. charcoal, 10x14	8 00 @ 8 25
I. C. charcoal, 14x20	6 00 @ 6 25
I. X. charcoal, 14x20	8 00 @ 8 25
I. C. coke, 14x20	5 00 @ 5 25
I. C. coke, terne, 14x20	5 00 @ 5 25
I. C. charcoal, terne, 14x20	5 10 @ 5 75

ZINC.—Duty, sheet, ⅌ ℔. 2½c.

Sheet (gold) foreign ⅌ ℔	$0 7⅜ @ $0 07½

LEAD.

Bar	$0 7¾
Sheet	0 9½
Pipe	0 9

Discount 10 per cent to trade.

BALTIMORE.

YELLOW PINE.

4-4 Virginia flooring boards	$13 50 @ 14 00
4-4 Virginia box boards	10 00 @ 10 50
Virginia scantling and joist	8 50 @ 11 00
4-4 Georgia sidings, cargo run	12 00 @ 15 00
Carolina bill timber to order—small	15 00 @ 16 00
Georgia bill timber to order—large	21 00 @ 22 00

WHITE PINE.

Selects and better, 4-4, 5-4 to 8-4	35 00 @ 40 00
Picks and selects	27 00 @ 30 50
Run of log	18 00 @ 19 00
Common cullings, stock	15 00 @ 17 00
Common cullings, all widths	12 00 @ 15 00

WALNUT.

Indiana, Nos. 1 and 2	70 00 @ 75 00
Culls	35 00
Newel stuff, 4 to 16 feet long, 6-6 to 10-10	70 00 @ 80 00

POPLAR.

West Virginia 5-8	12 00 @ 18 50
4-4	18 00 @ 24 00
Chair plank, 6-4	18 00 @ 21 00
Chair plank, thick	18 00 @ 24 00

ASH.

Tough white Ohio and Indiana, 1 to 5 in.	25 00 @ 30 00
Culls	15 00 @ 17 00
West Virginia	16 00 @ 25 00
Pennsylvania	22 00 @ 25 00

BANGOR.

QUOTATIONS.

Pine boards, No. 2	$40 00 @ 45 00
Pine boards, No. 3	35 00 @ 40 00
Pine boards, No. 1	25 00 @ 30 00
Gang pine planers	28 00 @ 32 00
Pine shippers	14 00 @ 17 00
Pine poor 1's	8 00 @ 9 50
Narrow pine boards	14 00 @ 16 00
Spruce dimensions, random size	10 00
Spruce boards and 1¼ inch	10 00 @ 16 00
Hemlock boards	8 00 @ 9 00
Pine deck plank	25 00 @ 35 00
Clapboards, extra heart	45 00
Clapboards, clear heart	40 00
Clapboards, extra sap	36 00 @ 40 00
Clapboards, clear sap	31 00 @ 35 00
Clapboards, No. 1 pine	22 00
Clapboards, extra spruce	23 00
Clapboards, clear spruce	18 00 @ 20 00
Clapboards, No. 1 spruce	15 00
Lath, spruce	1 35
Lath, pine	1 28 @ 1 30
Pickets, spruce, 5 to 6 feet	13 00 @ 25 00
Pickets, spruce, 4 feet	7 00 @ 12 00
Pickets, pine, 4 feet	14 00
Pickets, pine, 2 inch 4 feet	16 00 @ 17 00
Pickets, hemlock, 4 to 5 feet	7 00 @ 10 00
Pickets, hemlock frames	7 50
Shingles, best shaved cedar	4 50
Shingles, shaved cedar, 2d, 3d and 4th	3 00 @ 4 50
Shingles, best shaved pine	6 00
Shingles, shaved pine, 2d, 3d and 4th	4 00 @ 5 00

TOLEDO.

ROUGH LUMBER.

Three uppers, 1-inch	$28 00 @ $30 00
1¼, 1½ and 2-inch	30 00 @ 32 00
Selects, 1-inch	23 00
1¼, 1½ and 2-inch	25 00
Select, common, 1-inch	18 00
1¼, 1½ and 2-inch	20 00
Stock boards, A	25 00
B 1x12	18 00
B 1x10	17 00
common 1x12, 12, 14 and 16 feet	14 00
common 1x12, 18 and 20 feet	15 00 @ 16 00
common 1x10, 12, 14 and 16 feet	13 00
common 1x10, 18 and 20 feet	15 00
cull, 1x12	12 00
Common boards, 14 and 16 feet	12 00 @ 13 00
12, 18 and 20	13 00 @ 14 00
Cull boards	11 00
Strips, 1st and 2d clear, 6-inch	28 00 @ 30 00
first common, 6-inch	25 00 @ 27 00
second common, 6-inch	18 00
irregular, 4 to 7-inch	18 00
Fencing, 12, 14 and 16 feet	12 00
cull	11 00
Bill stuff, 12 to 18 feet	11 00 @ 13 00
18 to 26 feet	14 00 @ 16 00
Norway pine, 1st and 2d clear	18 00 @ 21 00
fine common	15 00
common	12 00
6-inch, 1st and 2d clear	20 00
fine common	15 00
fencing	11 00 @ 12 00
1x12, 1st and 2d clear	20 00
1x12, fine common	15 00
1x12, common	13 00
Shingles, 18-inch, XXX	3 10
18-inch, clear butts	2 10
Lath	1 75

DRESSED LUMBER.

Flooring, 1st and 2d clear	26 00
first common	23 00
second common	20 00
fence	16 00
Siding, 1st and 2d clear	18 00
first common	15 00
second common	13 00
patent	25 00
Shelving, 1-inch	20 00
Finishing, 1-inch	25 00

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Cement, Utica and Louisville, ⅌ bbl	1 75
Cement, Akron, ⅌ bbl	1 25
White sand, ⅌ bbl	1 25
Plaster paris, Mich., ⅌ bbl	1 50
Plaster paris, N. Y., ⅌ bbl	2 00 @ 2 25
Fire clay, ⅌ bbl	4 00
Plastering hair, ⅌ bush	25 @ 30

LUMBER—MICHIGAN PINE.

1st and 2d clear, 1 to 2-in	32 00 @ 34 00
3d clear, 1-in	25 00 @ 27 00
3d clear, 1¼ @ 2-in	26 00 @ 30 00
Select, 1-in., A	29 00 @ 21 00
Select, 1-in., B	15 00 @ 16 00
Select, 1¼ @ 2-in., A	25 00 @ 28 00
Select, 1¼ @ 2-in., B	18 00 @ 19 00
Wagon-box boards, 13-in. and upward, A	31 00 @ 33 00
Wagon-box boards, 13-in. and upward, B	26 00 @ 28 00
A stock boards, 10 to 12-in	28 00 @ 30 00
B stock boards, 10 to 12-in	25 00 @ 27 00
C stock boards, 10 to 12-in	17 00
Common stock boards, 12-in	14 00 @ 15 00
Common boards, 12 to 20 ft	11 00 @ 12 50
Fencing, 12 to 16 ft	10 50 @ 12 00
Round cedar posts	10 00 @ 15 00
Joist and scantling, 12 @ 18 ft	11 00 @ 12 00
Joist and scantling, 20 ft	12 00 @ 12 50
Joist and scantling, 22 @ 24 ft	13 00 @ 14 50
Flooring, 1st and 2d clear, rough	29 00 @ 30 00
Flooring, 1st common, rough	25 00 @ 26 00
Flooring, 2d common, rough	25 00 @ 28 00
Flooring, 1st common, dressed	26 00 @ 27 00
Flooring, 2d common, dressed	19 00 @ 21 00
Siding, 1st and 2d clear, dressed	16 50 @ 17 00
Siding, 1st common, dressed	14 50 @ 15 00
Siding, 2d common, dressed	11 00 @ 12 00
Timber, sawed, 12 @ 16 ft	11 00 @ 12 00
Pickets, square	9 00 @ 10 00
Pickets, flat	8 00 @ 10 00
Shingles, sawed, A	2 00 @ 2 20
Shingles, sawed, No. 1	75 @ 1 50
Lath	2 00 @ 2 25
Dry A shingles, on track	2 00 @ 2 75

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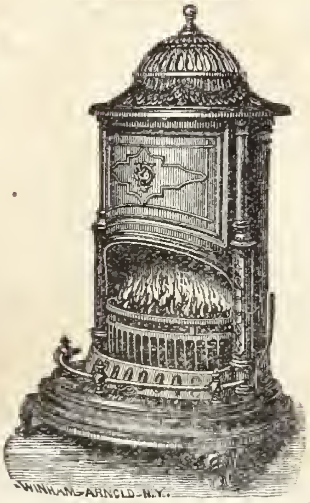
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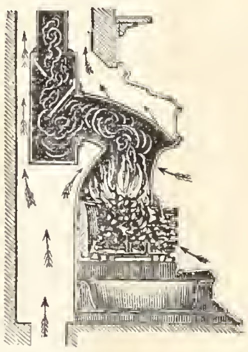

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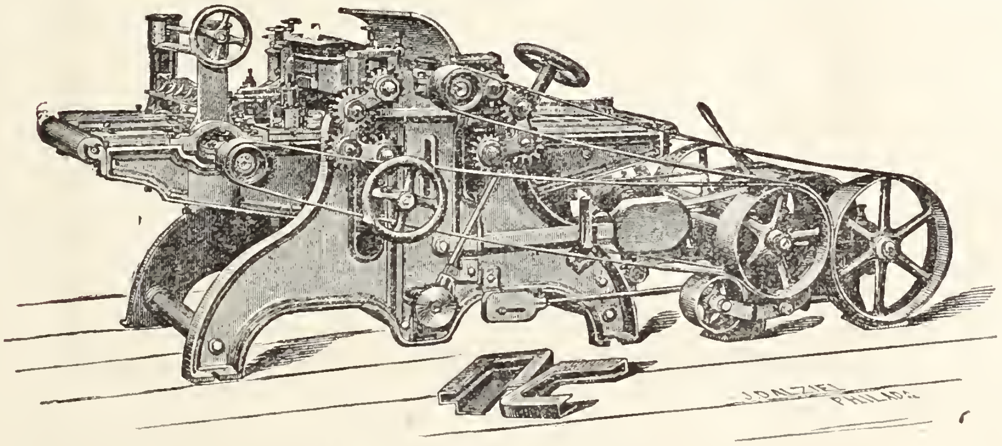
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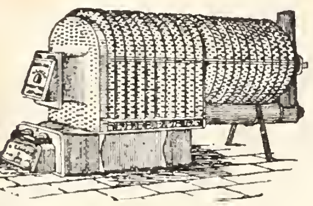

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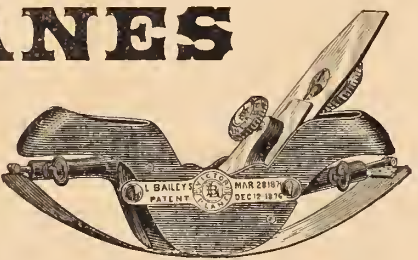

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